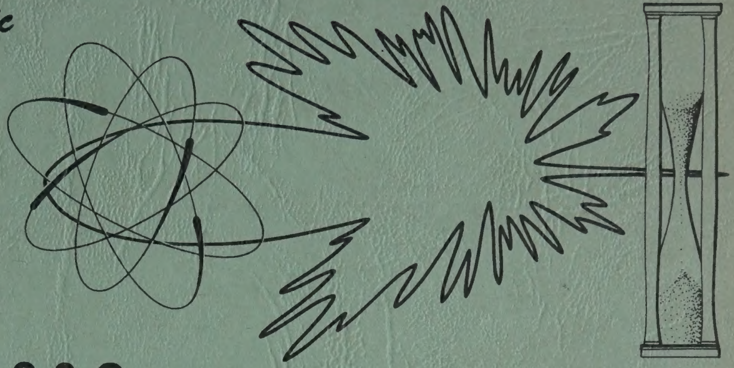
Electrical & Electronic

TEST EQUIPMENT DATA HANDBOOK



VOLUMES 5, 6, 7, 8 & 9

5 FIELD STRENGTH AND INTENSITY MEASURING EQUIPMENT

Index page 1

6 I[illegible]ANCE AND STANDING WAVE RATIO MEASURING EQUIPMENT

Index page - 137

7 ACTIVE NETWORKS

Index page - 36

8 TIME MEASURING AND COUNTING EQUIPMENT

Index page - 433

9 NUCLEAR ENERGY TEST AND MEASURING EQUIPMENT

Index page - 54

FREDERICK RESEARCH CORPORATION

FRC

TO THE USERS OF THIS HANDBOOK:

In recognition of the many problems associated with the selection of electrical-electronic test equipment for specific applications, Frederick Research Corporation has compiled a series of volumes which contain test equipment descriptions. The items described in the volumes are primarily those used by government agencies and contractors. At the request of the government, and in the interest of providing users with the desired information without the necessity of costly search and compilation, this firm has made this unclassified data available to government agencies and contractors for many years.

The United States Senate has twice cited the Frederick Research Corporation in the Congressional Record (1955 and 1960) for its achievements in efforts to save the government millions of dollars by avoiding duplication in government purchases and promoting the development and utilization of the best test equipment at the lowest cost consistent with quality. We believe that the material in these volumes should provide a means for users to review their test equipment requirements with a minimum expenditure of funds and technical man-hours.

FREDERICK RESEARCH CORPORATION

AIDS TO USE OF THE VOLUMES

This series of volumes has been prepared for the purpose of aiding engineers and other personnel in the selection of electrical-electronic test equipment to satisfy numerous test requirements. Thus, the format of the descriptive sheets has been specifically designed to provide the concise equipment data necessary for the selection procedure - functional description, electromechanical characteristics, reference source data, and other pertinent information. All data is as complete and current as the information available at the time the equipment description was prepared.

To save the maximum amount of time and to facilitate easy location of a particular item, the complete series has been divided into volumes based upon the accepted functional classification of equipment types. Thus, all equipments performing a specific type of test, monitoring, or measurement function are contained in one volume. For example, all equipments performing Voltage and Current Measuring functions are contained in Volume 1. Where the number of equipment descriptions in a particular class is insufficient to warrant an entire book, more than one volume (class) of equipment descriptions may be included in one book. For example, Volumes 5, 6, 7, 8 and 9 are contained in one book. The volumes are separated by green divider sheets.

Conversely, where the number of equipment descriptions is so large that a single book would be cumbersome, the volume will consist of two or more parts. For instance, Volume 10 is sufficiently large to warrant its division into parts.

Within each functional class and its subclasses, the descriptive sheets are arranged in alpha-numerical order based upon the equipment designation, e.g., ME-6B/U, ME-6D/U, ME-30/U, TS-375/U, and similarly until all descriptions in one particular class are covered.

The definitions and index of the functional classification categories and subclassifications will be found on the following pages. The alpha-numerical arrangement is provided to aid the user in his search for items in the event that only item nomenclature is known.

As an example of use of the Handbook, assume specific test requirements arise which dictate the use of a vacuum tube voltmeter (VTVM). To determine if there is an equipment having the necessary characteristics, locate the List of Handbook Volumes on Page iii in any of the Handbook volumes and note that voltage and current measuring equipments are located in Volume 1.

In Volume 1 turn to the Electronics Test Equipment Functional Classifications to find the functional class under which VTVM's appear. From the listing, it is seen that voltage measuring equipments are assigned the functional class of 1.1 and that VTVM's are most likely included in the subclass 1.1.1 Electronic Voltmeter. A check of the functional class definitions provided on Page vii will verify this.

Next, turn to the yellow divider, 1.1 Voltage Measuring Equipment, and proceed in that section to the equipment descriptions assigned the functional class 1.1.1. All VTVM descriptions will appear in alpha-numerical order within this section. Alpha-numerical listings of equipment descriptions within each subclass are provided in the Table of Contents.

Data on specific pieces of test equipment may also be quickly located. For instance, assume that one wanted to look up the characteristics of the ME-6D/U Electronic Multimeter. First, locate the correct volume as in the above example, which in this case is again Volume 1. In Volume 1 refer to the Alpha-Numerical Index, locate the item and note its functional class as being 1.1.1. Next, turn to the yellow divider 1.1 Voltage Measuring Equipment and proceed in that section to the descriptions assigned the functional class 1.1.1. The ME-6D/U is placed alpha-numerically in this class, physically located between the ME-6B/U and the ME-30/U.

A standard data format is used throughout the Handbook. Once the user has become familiar with this format, he will find it easy to locate specific data on a given instrument as well as convenient for the comparison of several instruments.

LIST OF HANDBOOK VOLUMES

Title	Volume
Voltage and Current Measuring Equipment	1
Frequency Measuring Equipment	2
Waveform Measuring and/or Analyzing Equipment	3
Signal Generating Equipment	4
Field Strength and Intensity Measuring Equipment	5
Impedance and Standing Wave Ratio Measuring Equipment	6
Active Networks for Test Purposes	7
Time Measuring and Counting Equipment	8
Nuclear Energy Test and Measuring Equipment	9
Multifunction Test and Measuring Equipment	10
Associated Devices for Test and Measuring Equipment	11
Passive Networks for Test Purposes	12
Standards and Calibration Equipment for Test and Measuring Equipment	13
Power and Energy Measuring Equipment	14
Temperature Indicating, Measuring, and Recording Equipment	15
Stress, Strain and Flaw Detecting and Measuring Equipment	16
Gas and/or Liquid Measuring and Analyzing Equipment	17
Kinematic Test and Measuring Equipment	18
Optical Testing, Measuring and Aligning Equipment	19

ELECTRICAL & ELECTRONIC

TEST EQUIPMENT DATA HANDBOOK

VOLUME 5

5

FIELD STRENGTH AND INTENSITY MEASURING EQUIPMENT

FREDERICK RESEARCH CORPORATION
2601 UNIVERSITY BOULEVARD, WEST
WHEATON, MARYLAND

ELECTRICAL & ELECTRONIC

TEST EQUIPMENT DATA HANDBOOK

VOLUME 5

5

FIELD STRENGTH AND INTENSITY MEASURING EQUIPMENT

FREDERICK RESEARCH CORPORATION
2601 UNIVERSITY BOULEVARD, WEST
WHEATON, MARYLAND

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION

5. FIELD STRENGTH AND INTENSITY MEASURING EQUIPMENT

5.1 Electromagnetic Field Detecting, Indicating, and Measuring Equipment

5.1.1 Electromagnetic Field Strength Measuring Equipment

5.1.2 Electromagnetic Field Detecting and Indicating Equipment

5.1.3 Combination Electromagnetic Field Strength Measuring and Indicating Equipment

5.2 Antenna Pattern Measuring Equipment

5.3 Magnetic Field Measuring Equipment

5.4 Electric Field Measuring Equipment

5.5 Sound Level Measuring Equipment

5.6 Thermal Radiation Detecting, Indicating, and Measuring Equipment

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION - DEFINITIONS

5. FIELD STRENGTH AND INTENSITY MEASURING EQUIPMENT

Equipment used to measure electric, magnetic, electromagnetic and acoustic field strength, field density and power or energy flux (intensity).

5.1 ELECTROMAGNETIC FIELD DETECTING, INDICATING, AND MEASURING EQUIPMENT

Equipment used to detect the presence of, indicate or measure the field strength (potential gradiant) of an electromagnetic field.

5.1.1 ELECTROMAGNETIC FIELD STRENGTH MEASURING EQUIPMENT

A test instrument used to measure an electromagnetic potential gradient on an absolute scale.

5.1.2 ELECTROMAGNETIC FIELD DETECTING AND INDICATING EQUIPMENT

A test instrument used to show the presence or absence of an electromagnetic field, and/or provide a measure of the potential gradient on a relative scale.

5.1.3 COMBINATION ELECTROMAGNETIC FIELD STRENGTH MEASURING AND INDICATING EQUIPMENT

A test instrument used to measure radiated fields by means of a calibrated electromagnetic coupling device, or relative field strength by coupling to electrical conductors, through a suitable network provided with the instrument.

5.2 ANTENNA PATTERN MEASURING EQUIPMENT

An equipment used to measure the relative field strength or intensity existing at any point or points in the region of space immediately surrounding an antenna.

5.3 MAGNETIC FIELD MEASURING EQUIPMENT

A device which measures the flux density of a magnetic field.

5.4 ELECTRIC FIELD MEASURING EQUIPMENT

A device which measures the electric flux density of an electric field.

5.5 SOUND LEVEL MEASURING EQUIPMENT

A device which measures the intensity of sound.

5.6 THERMAL RADIATION DETECTING, INDICATING, AND MEASURING EQUIPMENT

A device which detects, indicates, and measures the radiation effects of heat-producing elements.

TABLE OF CONTENTS

5. FIELD STRENGTH AND INTENSITY MEASURING EQUIPMENT

5.1 ELECTROMAGNETIC FIELD DETECTING, INDICATING, AND MEASURING EQUIPMENT

Functional Classification	Designation	Name	
5. 1. 1	TS-318/UP	Field Intensity Meter	23
5. 1. 1	TS-432/U	Noise-Field Strength Meter	27
5. 1. 1	TS-579/U	Field Strength Meter	29
5. 1. 1	TS-587A/U	Noise-Field Intensity Meter	33
5. 1. 2	I-149	Test Set	37
5. 1. 2	ID-263/U	RF Indicator-Probe	39
5. 1. 2	TS-446/U	Radio Frequency Indicator	41
5. 1. 2	TS-509/UR	Field Strength Meter	43
5. 1. 3	AN/PRM-1A	Radio Test Set	47
5. 1. 3	AN/URM-3	Radio Interference Measuring Set	51
5. 1. 3	AN/URM-6	Radio Test Set	55
5. 1. 3	AN/URM-7	Radio Interference Measuring Set	61
5. 1. 3	AN/URM-17	Radio Test Set	65
5. 1. 3	AN/URM-41	Field Intensity Meter	69
5. 1. 3	AN/URM-47	Radio Interference Measuring Set	75
5. 1. 3	Empire NF-105	Noise and Field Intensity Meter	79
5. 1. 3	Empire NF-112	Field Intensity Meter	83
5. 1. 3	Polarad FIM	Field Intensity Meter	87
5. 1. 3	Stoddart NM-60A	Radio Frequency Measuring Set	93

TABLE OF CONTENTS (Continued)

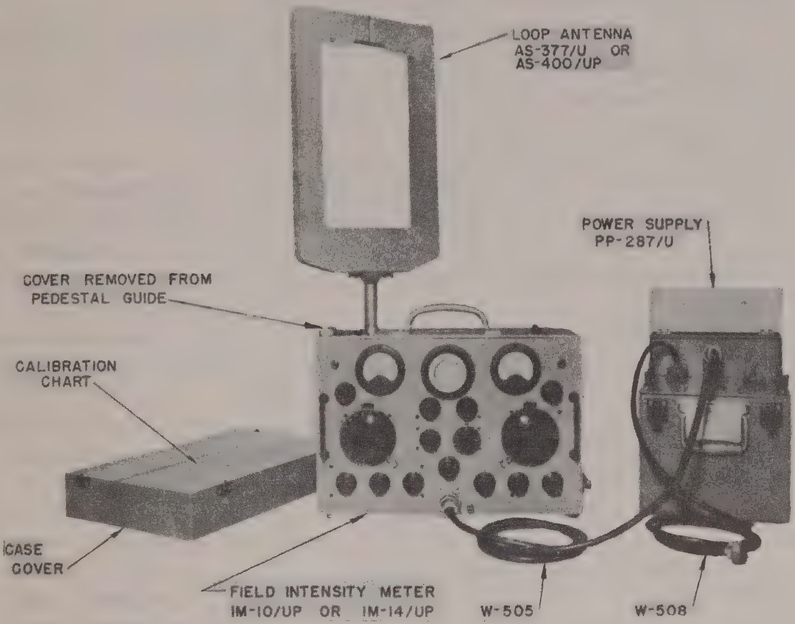
Functional Classification		Designation	Name	
	5.1.3	Stoddart NM-62A	Radio Interference Measuring Set	97
5.2	ANTENNA PATTERN MEASURING EQUIPMENT			
	5.2	TS-131/AP	Pickup Assembly	105
5.3	MAGNETIC FIELD MEASURING EQUIPMENT			
	5.3	TS-15/AP	Fluxmeter	111
	5.3	TS-15A/AP	Fluxmeter	113
	5.3	TS-15B/AP	Fluxmeter	115
	5.3	TS-15C/AP	Fluxmeter	119
	5.3	Dyna-Labs D-79	Gaussmeter	121
5.5	SOUND LEVEL MEASURING EQUIPMENT			
	5.5	AN/URM-38	Audio Level Meter	125

ALPHA-NUMERICAL INDEX

Designation	Name	Functional Classification
AN/PRM-1A	Radio Test Set	5. 1. 3
AN/URM-3	Radio Interference Measuring Set	5. 1. 3
AN/URM-6	Radio Test Set	5. 1. 3
AN/URM-7	Radio Interference Measuring Set	5. 1. 3
AN/URM-17	Radio Test Set	5. 1. 3
AN/URM-38	Audio Level Meter	5. 5
AN/URM-41	Field Intensity Meter	5. 1. 3
AN/URM-47	Radio Interference Measuring Set	5. 1. 3
I-149	Test Set	5. 1. 2
ID-263/U	RF Indicator-Probe	5. 1. 2
TS-15/AP	Fluxmeter	5. 3
TS-15A/AP	Fluxmeter	5. 3
TS-15B/AP	Fluxmeter	5. 3
TS-15C/AP	Fluxmeter	5. 3
TS-131/AP	Pickup Assembly	5. 2
TS-318/UP	Field Intensity Meter	5. 1. 1
TS-432/U	Noise-Field Strength Meter	5. 1. 1
TS-446/U	Radio Frequency Indicator	5. 1. 2
TS-509/UR	Field Strength Meter	5. 1. 2
TS-579/U	Field Strength Meter	5. 1. 1
TS-587A/U	Noise-Field Intensity Meter	5. 1. 1
Empire NF-105	Noise and Field Intensity Meter	5. 1. 3
Empire NF-112	Field Intensity Meter	5. 1. 3
Dyna-Labs D-79	Gaussmeter	5. 3
Polarad FIM	Field Intensity Meter	5. 1. 3
Stoddart NM-60A	Radio Frequency Measuring Set	5. 1. 3
Stoddart NM-62A	Radio Interference Measuring Set	5. 1. 3

5.1 ELECTROMAGNETIC FIELD DETECTING, INDICATING, AND MEASURING EQUIPMENT

FIELD INTENSITY METER TS-318/UP
(METER, FIELD STRENGTH, TS-318/UP)



FUNCTIONAL DESCRIPTION:

A portable instrument used to measure field intensity and pulse repetition rate of Loran signals and field intensity of continuous waves. It compares the incoming signal against a measured pulse signal generated in the field intensity meter. The comparison is made by superimposing both signals on the vertical deflecting plates of the cathode ray tube (visible on the front panel), adjusting the sweep rate so that the pulses remain stationary on the screen and adjusting the height of the calibrating pulse to the same height as the incoming signal. By use of field intensity graphs the intensity of this signal is obtained from the vacuum tube voltmeter reading. The pulse recurrence rate is obtained from the reading of the sweep frequency dials.

The field intensity of continuous wave signals may be determined by measuring the amount of internally generated constant voltage necessary to give the same deflection as the received signal.

All controls and indicators are located on the operating (front) panel.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-526245	F17-M-23328-6346	3F4325-318
PROCUREM'T INFO.:	BuShips Spec. No. RE13A1031A		
PROCUREM'T COG.:	Navy	DESIGN COG.:	Navy, BuShips
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 5.1.1		
	- Electronics Test Equipment -		TS-318/UP

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

FIELD INTENSITY METER TS-318/UP
(METER, FIELD STRENGTH, TS-318/UP)

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to TS-635/UP except for frequency range.

Equipment required but not supplied: One vertical antenna, 10 to 60 feet high.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of a cathode ray indicator unit, a sweep generator unit, a signal generator unit and a receiver.

The sweep generator unit supplies voltages for the horizontal deflection plates and for synchronization of the calibrating pulses from the signal generator. A vacuum tube voltmeter indicates the radio frequency level of the signal generator section output. This output passes through an attenuator to the antenna where it is fed into the receiver section along with the incoming section picked up by the antenna.

Power Supply: 115 volts AC, single phase, 60 cycles per second or 6 volts DC (internal or external battery) or Power Supply Unit PP-287/U.

Frequency Range: 1550 to 2500 kilocycles per second.

Field Intensity Range: 50 microvolts per meter to 15 volts per meter with loop antenna, 1 microvolt per meter minimum with 60-foot vertical antenna.

Pulse Repetition Rates: 49,300 to 50,000 microseconds S (slow).
39,300 to 40,000 microseconds L (low).
29,300 to 30,000 microseconds H (high).

Type of Reception: Continuous Wave, Pulsed.

Receiver: Superheterodyne, 455 kilocycles per second, intermediate frequency.

Output Indicators: Two-inch cathode ray tube for Loran or pulse, 0 to 1 milliamperes DC meter for continuous wave.

MANUFACTURERS' OR CONTRACTORS' DATA:

Washington Institute of Technology, Inc., 4810 Calvert Road, College Park, Maryland; Contract No. NXsr-88850, 5 February 1945; Contract No. NObsr-39362, 26 June 1947.

TUBE COMPLEMENT:

1 JAN-2AP1A, 1 JAN-6X5GT/G, 2 JAN-6AK5, 1 JAN-6AL5, 3 JAN-6AS6, 1 JAN-6AQ6, 1 JAN-6SA7, 1 JAN-OA3/VR-75, 1 JAN-OD3/VR-150, 1 JAN-8016, 2 JAN-9002, 3 JAN-9003.

REFERENCE DATA AND LITERATURE:

NavShips 91089 (Instruction Book).

TO 16-35TS318-5 (Instruction Book).

SHIPPING DATA:

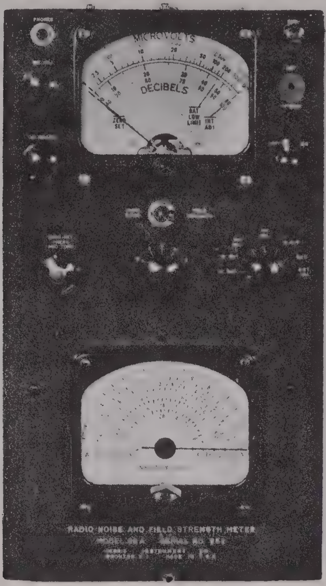
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Field Intensity Meter, TS-318/UP	5.2	18-1/4	26-5/8	18-1/4	104
1	Power Supply	4.2	16-1/8	27-1/4	16-1/8	90
1	Storage Battery	1.1	13	14-1/2	9-1/2	60
1	Spare Parts	2.9	14-3/4	24-1/4	14	80

FIELD INTENSITY METER TS-318/UP
(METER, FIELD STRENGTH, TS-318/UP)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Field Intensity Meter, TS-318/UP Including:		7CAC-526245 F17-M-23328-6346 3F4325-318				
1	Field Intensity Meter, IM-10/UP	Aluminum		14-27/32	19-15/16	11-1/8	50.9
1	Antenna Assembly, AS-377/U			28-1/4	12	1-3/16	5.5
1	Antenna Coupler CU-142/U			4-3/4	3-15/16	1-11/16	0.7
1	Power Supply Less Battery PP-287/U			11-7/8	20-9/16	11-1/16	37.0
1	Storage Battery 6V-SBM-50AH			9-1/2	10	7-1/4	40.0
1	Adapter Signal Generator Output CWI-62408						
1	Power Cable Assembly CWI-62407 (inter unit)			78 long			
1	Power Cable Assembly						
1	Video Output Cable Assembly						
1	External Synchronizing Cable Assembly						
1	Eye Shield						
1	Battery Cable(+)						
1	Battery Cable(-)						
1	Set Calibration Charts						
2	Instruction Book						
1	Spare Parts			12	18-1/16	12	45.0

NOISE-FIELD STRENGTH METER TS-432/U
(METER, FIELD STRENGTH, TS-432/U)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, field and depot radio interference and field strength meter, used for measurements of carrier voltages and fields, interference voltages and fields, signal-to-noise ratio, voltages on lines and conductors, antenna field patterns, filter characteristics, localization of noise sources and interference reduction means, and all kinds of radio interference fields.

The tuning dial is graduated in megacycles, while the output meter scale reads directly in microvolts the value of the voltage applied to the input.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Ferris Model 32-A Radio Noise and Field Strength Meter.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A single radio frequency stage feeds into a combination mixer

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	1600-326196000	F17-M-23304-5347	3F2728-1
PROCUREM'T INFO.: Navy Specs. RE13A678 and RE13A678B.			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 5.1.1		
- Electronics Test Equipment -			TS-432/U

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

NOISE-FIELD STRENGTH METER TS-432/U
(METER, FIELD STRENGTH, TS-432/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)
and oscillator. This is followed by two intermediate frequency stages and a detector. There is no audio frequency stage. The circuits are designed for compactness and simplicity of operation.

Power Supply: Normally supplied with small dry battery pack (32-BPI). Large battery pack, AC power pack, or 115 volt, 60 cycles per second, rectifier packs may be obtained by special order.

Frequency Range: 150 to 350 kilocycles per second and 550 to 20, 000 kilocycles per second in five bands: 150 to 350, 550 to 1550, 1550 to 4000, 4000 to 10, 000, 10, 000 to 20, 000. The gap is for the intermediate frequency of 455 kilocycles per second.

Voltage Range: 1 to 1000 microvolts and 100 to 100, 000 microvolts.

Field Intensity Range: 2 to 200, 000 microvolts (with standard antenna).

Standard Time Constants: Charge 10 milliseconds, discharge 600 milliseconds.

Sensitivity: 1 microvolt.

Calibrating Source: Internal shot noise diode oscillator (calibration curves are supplied).

MANUFACTURERS' OR CONTRACTORS' DATA:
Ferris Instrument Company, Boonton, New Jersey; Approximate Cost per Unit, $500. 00

TUBE COMPLEMENT:
3 RETMA-D5GP, 1 RETMA-H6G, 1 JAN-5Y3GT, 1 RETMA-C7G, 1 RETMA-H4G, 1 JAN-6SJ7, 1 RETMA-B1, 1 JAN-6L6, 1 JAN-991.

REFERENCE DATA AND LITERATURE:

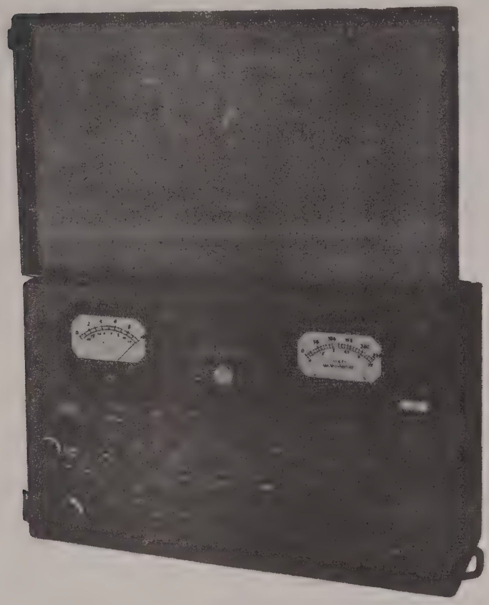
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Noise-Field Strength Meter TS-432/U					28

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Noise-Field Strength Meter TS-432/U		1600-326196000 F17-M-23304-5347 3F2728-1	13-1/4	7	12	22
1	Telescoping Rod Antenna			41 long			

FIELD STRENGTH METER TS-579/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose, field intensity meter, designed for measuring field intensities of radio transmitters operating in the HF and VHF spectra for the purpose of checking antenna efficiency, coverage, service area, and also for carrying out research work or propagation studies. The instrument may be used in conjunction with a standard recording meter for making records of the variation in signal intensity and may also be employed with a noise meter attachment for indicating the noise level on any particular radio frequency channel. The instrument is designed to provide either linear or logarithmic output to facilitate recording. It has been designed particularly for field use and is arranged for convenient operation and for carrying from one location to another. The instrument requires the use of calibration curves, which are supplied for converting readings into field intensity values.

RELATIONSHIP TO OTHER EQUIPMENT:

This instrument is similar to RCA Type 301-B Field Intensity Meter.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-526225		3F3309-1
PROCUREM'T INFO.:			
PROCUREM'T COG.: Army		DESIGN COG.: Army, CSL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5. 1. 1	
- Electronics Test Equipment -			TS-579/U

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

FIELD STRENGTH METER TS-579/U

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A local oscillator provides a calibrating voltage source. Its voltage is put across the transmission line coming from the doublet. A superheterodyne receiver unit is used. Automatic volume control is used on the three stage IF amplifier to obtain a logarithmic output characteristic. The diode second detector output is amplified by a triode DC amplifier which drives the output meter.

Power Supply: Vibrator and Battery, 6 volts, DC, at 4 amperes load.

Frequency Range: 18 to 125 megacycles per second in 3 bands. Tuning dial ratios of 30 to 1 and 5 to 1.

Type of Reception: Continuous Wave, Modulated Continuous Wave.

Field Intensity Range: 10 to 500, 000 microvolts per meter and 50 to 2, 500, 000 microvolts per meter.

Output Scale:
  Linear: 10 to 1 or 20 decibels.
  Logarithmic: 100 to 1 or 40 decibels.

Output:
  Audio: Operates phones or noise meter.
  Recorder: Operates any recorder of 5 milliamperes and 560 ohms maximum resistance.

Antenna: Doublet in 6 sections, 4 fixed and 2 variable sections of stainless steel. Variable sections cover frequency range down to 37.5 megacycles per second.

Antenna Support: Bakelite tripod adjustable to 137 inches.

RF Transmission Line: Length 30 feet, 2 wire shielded, rubber covered line.

Accuracy: ±10% of indicated field intensity.

MANUFACTURERS' OR CONTRACTORS' DATA:

Radio Corporation of America, Camden, New Jersey.

TUBE COMPLEMENT:

2 JAN-955, 3 JAN-6K7, 1 JAN-0D3, 1 JAN-954, 1 JAN-6R7.

REFERENCE DATA AND LITERATURE:

TO 16-35TS579-3 (Field Strength Meter).

SHIPPING DATA:

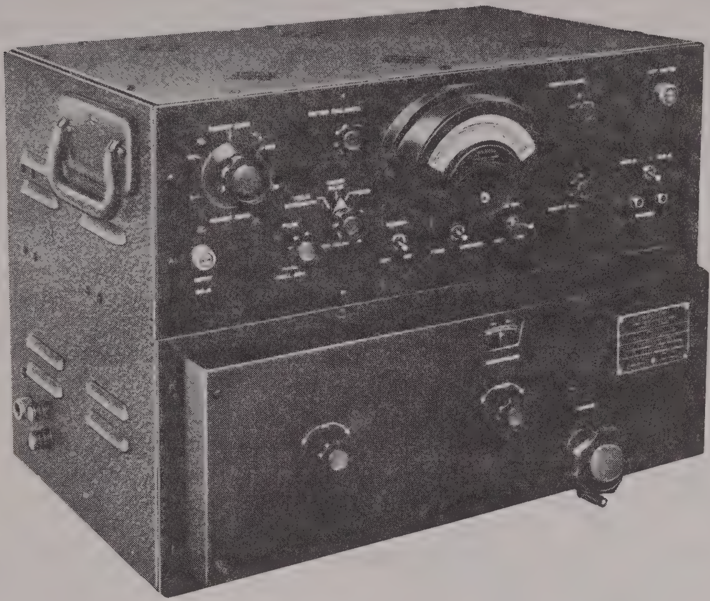
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

FIELD STRENGTH METER TS-579/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Field Strength Meter TS-579/U	Aluminum	7CAC-526225 3F3309-1	13	20-3/8	9-1/4	38
1	Vibrator Power Supply	Aluminum		14-3/4	13-1/4	7-1/4	16 less battery 36 with battery
1	Accessory Case Including:	Fiber and Wood		12	39	7-3/8	24
1	Dipole Antenna						
1	Antenna Support						
1	Shielded RF Transmission Line						

NOISE-FIELD INTENSITY METER TS-587A/U



FUNCTIONAL DESCRIPTION:

A field and depot equipment used to locate and measure RF interference and to make field strength measurements. It can be used as a two terminal sensitive voltmeter. A tripod is furnished for mounting the antennas. Signal monitoring provisions are available from the phone jacks. Measurements can be made with the receiver in terms of the peak value of the interference (the PEAK function), in terms of a weighted value (the QUASI-PEAK function), or in terms of the average value (the FIELD INTENSITY function). The measurements are made using the panel-mounted meter or the remote meter jacks. The meter scale is directly calibrated in microvolts, decibels, and arbitrary units of "shot noise". Arbitrary units of "shot noise" are used only in the calibration procedures of the equipment. By use of correction curve furnished with the equipment, the meter readings can be converted to microvolts per meter.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to the Stoddart Model NMA-5A.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-T-20141-9606	
PROCUREM'T INFO.:			
PROCUREM'T COG.:	Navy	DESIGN COG.:	Navy, BuShips
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	5.1.1
	- Electronics Test Equipment -		TS-587A/U

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

NOISE-FIELD INTENSITY METER TS-587A/U

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: It is a high-sensitivity HF and VHF superheterodyne radio receiver which contains internal means for calibrating its VTVM section. Four decade steps of attenuation are inserted between the antenna input and the RF head. The output signal of the attenuator is fed to the RF head, where it is amplified and mixed with the local oscillator frequency, producing the intermediate frequency. The IF signal is amplified in four IF stages and demodulated in the detector stage. The demodulated signal is acted upon by the meter detector weighting circuits and applied to the VTVM stage, thus actuating the meter. The audio components are subsequently amplified and delivered to the headphone jacks.

Power Supply: 115 volts, ±10%, AC, single phase, 60 cycles per second, 0.96 amperes at 92% power factor.

Frequency Range: 15 to 400 megacycles per second in four bands.
LF Head: 15 to 31, 29 to 64, 60 to 125 megacycles per second.
HF Head: 100 to 400 megacycles per second.

Intermediate Frequency: LF Head: 12 megacycles per second.
HF Head: 30 megacycles per second.

Voltage Scale: 0 to 100 microvolts.
-6 to 40 decibels.
0 to 8 arbitrary units of shot noise.

Input Voltage Range: 2 to 100,000 microvolts. Balance resistance attenuator with steps of: X1, X10, X10^2, and X10^3.

Receiver Output: 200 milliwatts maximum.

Input Impedance: 95 ohms, balanced to ground.

Output Impedance: 300 or 4000 ohms, for headphone.

Sensitivity: Two-terminal Voltmeter: LF Head: 2 microvolts.
HF Head: 5 microvolts.
Field Intensity Meter: LF Head: 20 microvolts per meter.
HF Head: 5 microvolts per meter.

Bandwidth: LF Head: 150 kilocycles per second at 6 decibels down.
HF Head: 210 kilocycles per second at 6 decibels down.

MANUFACTURERS' OR CONTRACTORS' DATA:

Stoddart Aircraft Radio Company, 6644 Santa Monica Boulevard, Hollywood 38, California, Contract No. NObsr-30088, dated 15 June 1946, Contract No. NObsr-30140, dated 21 June 1946, Contract No. NObsr-30200, dated 26 June 1946, Contract No. 39272, dated 27 June 1947.

TUBE COMPLEMENT:

RF-36/U: 2 JAN-6AK5, 2 JAN-6C4.
RF-37/U: 2 JAN-6J4, 1 JAN-6J6, 1 JAN-9002.
AM-194/U: 1 JAN-6AL5, 1 JAN-6AQ6, 4 JAN-6BA6.
AM-195/U: 1 JAN-6AL5, 1 JAN-6AQ6, 4 JAN-6SG7.
PP-267/U: 1 JAN-OD3/VR-150, 1 JAN-5Y3GT/G, 1 JAN-6H6, 1 JAN-6J5GT/G, 1 JAN-6L6GA, 1 JAN-6SJ7, 2 JAN-6V6 or 6V6GT/G.

NOISE-FIELD INTENSITY METER TS-587A/U

REFERENCE DATA AND LITERATURE:

Navships 900, 990 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Noise-Field Intensity Meter TS-587A/U	3.53	36	47	36	330

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Noise-Field Intensity Meter TS-587A/U		F16-T-20141-9606	15-3/16	21-1/2	29-1/2	64
1	Canvas Cover						2
1	Equipment Case CY-606/U Containing:		16-C-170001-254	15	40	9	53 (w/contents)
1	Radio Frequency Head RF-36/U		15-C-12161-100	6-1/2	17-1/2	14	
1	Intermediate Frequency Amplifier AM-194/U		16-A-32246-2934	4-1/2	13-1/2	5	
1	Dipole Antenna AS-385/U		16-A-45177-9701	60 long			
2	Dipole Mast Section for AS-385/U			33 long			
1	Loop Probe MX-822/U		16-A-45883-2134		8-3/4 dia.		
1	Measuring Tape CADV-10671		16-T-19041-1001	2	1-3/4	3/4	

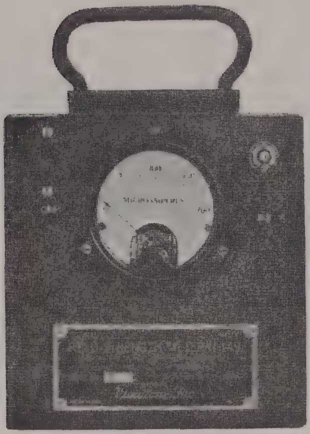
(Continued)

NOISE-FIELD INTENSITY METER TS-587A/U

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
2	Instruction Book Navships 900, 990						
1	Accessory Case CY-607/U Containing:		16-C-170001-255	15	40	9	40 (w/contents)
1	Dipole Antenna CADV-66151-A			44 long			
2	Dipole Mast Section for CADV-66151-A						
1	Loop Probe MX-821/U		16-A-45902-1134	5-1/2	1-17/32 dia.		
1	Line Probe CADV-491087		16-P-87007-1041	5-3/8	2-1/4 dia.		
1	Antenna Tripod CADV-10545		16-T-802001-107	37-1/2	3-13/16 dia.		
1	Matching Impedance CADV-471228		16-A-22081-1007	2-5/8	1-23/32 dia.		
1	Input Cable CG-444/U		16-C-12400-4616	72 long			
1	Power Cable						
						Total:	159.0

TEST SET I-149
(MIXER STAGE I-149)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, field strength meter used to measure relative transmitted field strength of radio and radar sets within its frequency range. Indication is on a meter dial in microamperes. This meter is used in organizational and field maintenance.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Essentially this instrument is a half-wave diode rectifier which rectifies pulse voltage and indicates the rectified voltage on a DC microammeter. This value is proportional to the strength of the electric field at the receiving point.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-526231		3F4149
PROCUREM'T INFO.: Army Dwg. ES-D-11147			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, Rome	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5.1.2	

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

TEST SET I-149
(MIXER STAGE I-149)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: One internal Battery BA-65 (6.3 volts, DC).
Frequency Range: 100 to 112 megacycles per second.
Current Range: 0 to 200 microamperes, DC; 0 to 600 microamperes, DC.
Field Intensity Range: Relative.

MANUFACTURERS' OR CONTRACTORS' DATA:

Espey Manufacturing Company, Inc., 528 East 72nd Street, New York 21, New York; Order No. 995-SCRL-42.

Viewtone Company, Inc., New York, New York; Order No. 103-MPD-44; Approximate Cost per Unit, $125.00.

TUBE COMPLEMENT:

1 JAN-1N5GT/G.

REFERENCE DATA AND LITERATURE:

TO 16-40RC70-2 (Operating Instructions for Test Equipment RC-70-A).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set I-149 (Shelf Package)	0.19	8	8	5	5.9

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set I-149	Sheet-iron	7CAC-526231 3F4149	6	6	2-3/4	3.0

RF INDICATOR-PROBE ID-263/U

FUNCTIONAL DESCRIPTION:

A general purpose probe used to indicate the presence of RF fields of relatively large magnitude such as exist around transmitters. An extension rod which slips onto the tip of the probe is provided in order to reach into a deep chassis or into high voltage areas. When the extension rod is used, it normally increases the sensitivity of the unit.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: When the unit is placed in an RF field, dielectric or capacity currents flow through the coupling capacitor. On the positive half cycle the capacity current flows through a germanium diode to the instrument frame, and then through the operator's hand capacity to the operator, and back into the field. This prevents the coupling capacitors from assuming a DC charge. On the negative

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-657535	F17-P-84881-7676	3F3711-263
PROCUREM'T INFO.:	Navy Spec. CS-838		
PROCUREM'T COG.:	Navy	DESIGN COG.:	Navy, BuShips
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	5.1.2
	- Electronics Test Equipment -		ID-263/U

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RF INDICATOR-PROBE ID-263/U

ELECTROMECHANICAL DESCRIPTION: (Continued)
half cycle the current flows through a second diode and DC meter which indicates the magnitude of this current.
Power Supply: None.
Frequency Range: 100 kilocycles per second to 400 megacycles per second.
Sensitivity: 25% full scale for one volt per meter of RF field applied to tip of probe at 3.5 megacycles; 5 volts per meter for 25% full scale at 30 megacycles with extension rod in RF field; 200 microamperes full scale for meter.
RF Signal: 10 volts maximum across crystal diode.
Meter Range: 0 to 100 (arbitrary scale); 10 scale divisions.

MANUFACTURERS' OR CONTRACTORS' DATA:

Radio Frequency Laboratories, Inc., Boonton, New Jersey; Type H-2360; Navy Contract NObsr-42100 dated 17 February 1948, and Navy Contract NObsr-49181 dated 1 June 1950.

TUBE COMPLEMENT:

2 JAN-IN34 (Crystal Rectifier).

REFERENCE DATA AND LITERATURE:

NAVSHIPS 91146 (Instruction Book for AN/USM-3).

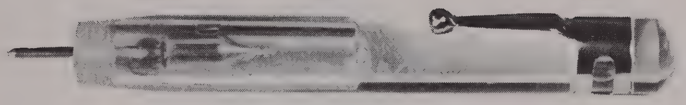
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	RF Indicator-Probe ID-263/U	0.028	8	3-1/2	1-3/4	0.375

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Indicator-Probe ID-263/U	Plastic	7CAC-657535 F17-P-84881-7676 3F3711-263	6	1 dia.		0.156
1	Extension Rod O-904			5 long			0.031

RADIO FREQUENCY INDICATOR TS-446/U
(INDICATOR, ELECTRICAL, POTENTIAL, TS-446/U)



FUNCTIONAL DESCRIPTION:

A pocket size, pencil type indicator consisting of a neon bulb enclosed in a lucite tube designed to indicate the presence of stray radio frequency fields from all types of radio and radar transmitters. May also be used to provide a high voltage check on Power Transformers, etc., without the danger of shock.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Nominal Watts: 1/4 (NE-2) watts.

MANUFACTURERS' OR CONTRACTORS' DATA:

Star Measurements Company, 442 East 166th Street, New York 56, New York; Order No. 48-3138; Approximate Cost per Unit, $.30.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-439725		3F4325-446
PROCUREM'T INFO.: USAF Dwg. Nos.X45B40679 & 45A40680			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5.1.2	
- Electronics Test Equipment -			TS-446/U

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RADIO FREQUENCY INDICATOR TS-446/U
(INDICATOR, ELECTRICAL, POTENTIAL, TS-446/U)

MANUFACTURERS' OR CONTRACTORS' DATA: (Continued)

Bell Sound Systems Incorporated, 1190 Essex Avenue, Columbus 27, Ohio; Contract No. AF 33(038)25693.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

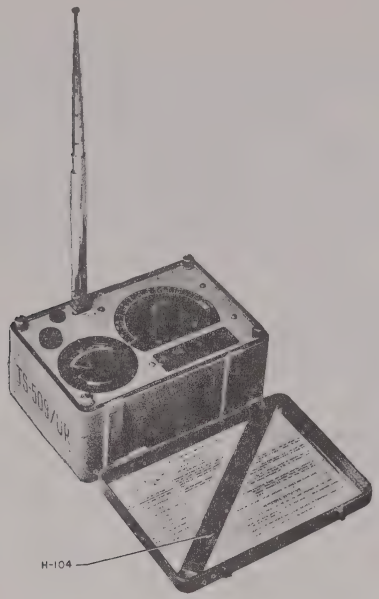
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Radio Frequency Indicator TS-446/U (Domestic Packed)	.000725	5	1/2	1/2	0.5

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radio Frequency Indicator TS-446/U (Complete)	Lucite	7CAC-439725 3F4325-446	4-5/8 long	1/2 dia.		0.5 oz.
1	Neon Bulb G.E. Bulb T-2						
1	Probe				5/8 dia.		
1	Pencil Type Pocket Clip						

FIELD STRENGTH METER TS-509/UR



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained unit housed in its own watertight carrying case. This instrument provides an indication of the relative field strength and approximate frequency of RF energy emitted by a transmitter within its frequency range. No tubes, batteries, or power supply are needed. A six section telescoping antenna plugs into a receptacle on the control panel. This antenna has a 90° joint at its base so it can be extended either horizontally or vertically. Also, the case can be placed either on its bottom or side, whichever position is best suited for given operating conditions. An extra jack is provided for direct input connection of very weak signals. Tuning is controlled by a knob on the panel, which is attached to a pointer and dial system. The pointer indicates the resonant frequency of the tuned circuit on the dial. A microammeter dial also on the panel indicates relative field strength. A sensitivity control protects the microammeter from damage due to reception of signals whose strength would otherwise cause it to go off scale or burn out.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-526230	F17-M-23375-1681	
PROCUREM'T INFO.: Spec. EP-387(Aer); Spec. 16M21(Aer)			
PROCUREM'T COG.: Navy	DESIGN COG.: Navy, BuAer		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 5. 1. 2		
- Electronics Test Equipment -			TS-509/UR

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

FIELD STRENGTH METER TS-509/UR

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The tubular antenna is adjustable to a quarter wavelength of the transmitted signal. It is loosely coupled to a butterfly L-C resonating circuit. When the butterfly circuit is tuned to resonance, a voltage builds up across it. This voltage is applied through a coupling capacitor to a crystal rectifier. The rectified signal is directed through two RF chokes to the microammeter. The microammeter is shunted by a variable resistor which acts as a sensitivity control.

Power Supply: None required.
Frequency Range: 100 to 400 megacycles per second.
Type of Reception: Continuous Wave, Interrupted Continuous Wave.
Distance Range: 0 to 75 feet.
RF Power Input Rating: Up to 40 watts.
Basic Meter Range: 0 to 50 microamperes, DC.
Accuracy: (Basic Meter) ±2% of full scale reading.
±5% or better of indicated frequency.

MANUFACTURERS' OR CONTRACTORS' DATA:

Harvey-Wells Electronics, Inc., Southbridge, Massachusetts; Navy Contract No. NOa(s)-10404.

TUBE COMPLEMENT:

1 JAN-1N21B (Rectifier).

REFERENCE DATA AND LITERATURE:

TO 16-35TS509-3 (Maintenance Instructions).

SHIPPING DATA:

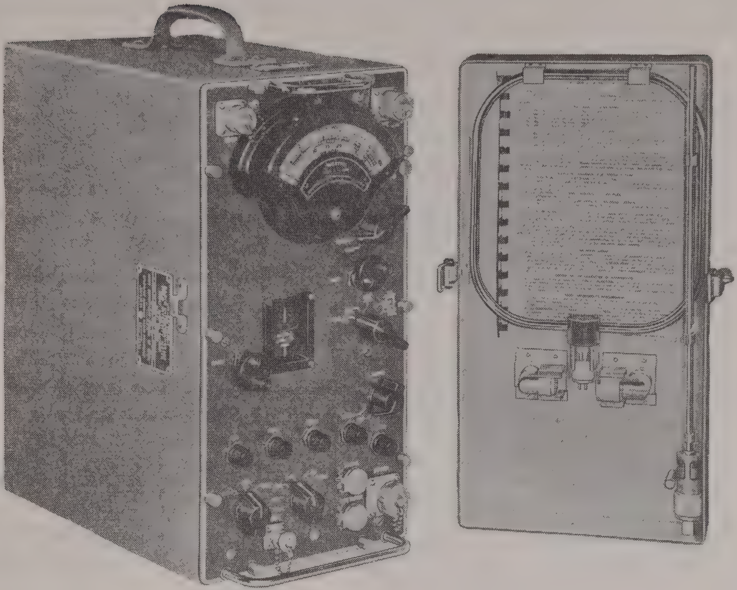
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

FIELD STRENGTH METER TS-509/UR

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Field Strength Meter TS-509/UR Including:	Aluminum	7CAC-526230 F17-M-23375-1681	4-15/16	7-11/16	6	8
1	Rod Antenna			Extended and Straight 32-1/2	9/16	7/16	0.3
				Collapsed and Bent 90° 6-5/8	1-7/16	9/16	

RADIO TEST SET AN/PRM-1A



FUNCTIONAL DESCRIPTION:

A portable, general purpose radio interference and field intensity measuring equipment used for radio interference surveys to determine the source of radiated or conducted interference from any source within its frequency range. The test set may also be used as a selective two-terminal voltmeter to measure the gain of a radio frequency stage, to measure conducted interference on power and transmission lines and to provide null indications when used in conjunction with a radio frequency bridge. Measurements can be made with the equipment in terms of the peak value of the interference (the PEAK function), in terms of a weighted value (the QUASI-PEAK function), or in terms of the average value (the FIELD INTENSITY function). Results are indicated on a dial calibrated in frequency and on a meter calibrated in both microvolts and decibels. Charts provide calibration settings for the input device in use, the effective bandwidth of the equipment for any given frequency and determining sine wave signal strength in the presence of ambient interference of random nature. Provision is made for the monitoring of the received signal by means of a headset, an external oscilloscope or an external meter.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.			
PROCUREM'T INFO.: Spec MIL-T-16206			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5.1.3	
- Electronics Test Equipment -			AN/PRM-1A

RADIO TEST SET AN/PRM-1A

RELATIONSHIP TO OTHER EQUIPMENT:
Similar to Radio Interference Field Intensity Meter Stoddart NM-20B.

ELECTROMECHANICAL DESCRIPTION:
Circuit Information: The equipment is essentially a seven band superheterodyne receiver provided with input attenuation and metering circuits for the measurement of detector output. The radio frequency signal received by the antenna or probe is delivered through a coaxial cable to the radio frequency input connector located on the front panel of the equipment. The radio frequency signal is amplified in the radio frequency stage and heterodyned with the local oscillator frequency in the mixer stage to produce an intermediate frequency. The intermediate frequency is amplified in four intermediate frequency stages and demodulated in the detector stage. The demodulated signal is acted upon by the meter detecting weighing circuits and applied to the vacuum tube voltmeter. The audio components are subsequently amplified and delivered to the headphone jacks.

Power Supply: 115 or 230 volts, AC, ±10%, 50 to 1600 cycles per second, single-phase, 25 watts, 87% power factor. Nine volts supplied by 2 Batteries Burgess 5360 (4.5 volts) and 1.5 volt supplied by 2 Batteries Burgess 2 (1.5 volt). Batteries required when AC is not available are 90 volts supplied by 2 Batteries Burgess 5308 (45 volts), and 1.5 volt supplied by 2 Batteries Burgess 4FH (1.5 volt).

Frequency Range: 0.15 to 25 megacycles per second in the following seven bands: 0.15 to 0.32, 0.32 to 0.75, 0.75 to 1.75, 1.75 to 3.8, 3.8 to 8, 8 to 15 and 15 to 25 megacycles per second.

Intermediate Frequency: 455 kilocycles per second for bands 1, 3 and 4; 1600 kilocycles per second for bands 2, 5, 6, and 7.

Image and Intermediate Frequency Rejection: 50 decibels minimum.

Meter Scale: 0 to 100 microvolts, 0 to 40 decibels.

Overall Effective Noise Bandwidth: 2 to 5 kilocycles per second.

Sensitivity:

As a Two Terminal Voltmeter: 1 microvolt at frequencies above 2 megacycles per second.

As a Field Intensity Meter: 2 microvolts per meter at frequencies above 2 megacycles per second using rod antenna.

Overload Capacity: 16 decibels.

Audio Output: 100 milliwatts.

Audio Output Impedance: 600 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:
Stoddart Aircraft Radio Company, Inc., 6644 Santa Monica Boulevard, Hollywood 38, California.

RADIO TEST SET AN/PRM-1A

TUBE COMPLEMENT:

Radio Test Set: 3 1T4, 1 1R5, 4 3V4, 4 3A5, 1 1U5.
Power Supply: 1 2A20, 1 OA3/VR75.

REFERENCE DATA AND LITERATURE:

Instruction Book for NM-20B.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Radio Test Set AN/PRM-1A					

- Electronic Test Equipment -

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radio Test Set AN/PRM-1A	metal		14	7-9/16	16-7/16	37
1	Power Supply PP-472B/PRM-1	metal		7-17/32	10-1/2	8-3/8	18
1	Rod Antenna AT-213/PRM-1			41 long			
1	Loop Antenna AT-212/PRM-1				8-1/4 dia.		
1	Loop Probe AT-211/PRM-1				1/2 dia.		
1	Line Probe MX-980/PRM-1						
1	Impedance Matching Network CU-195/PRM-1						
1	Impedance Matching Network, 50 Ohms CU-197/PRM-1						

(Continued)

RADIO TEST SET AN/PRM-1A

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	AC Power Cable			72 long			
1	Power Supply Cable			120 long			
1	Antenna Cable			240 long			
1	Instruction Manual						

RADIO INTERFERENCE MEASURING SET AN/URM-3

FUNCTIONAL DESCRIPTION:

A general purpose, field, and depot maintenance equipment used for detecting and measuring the intensity of radiated and conducted radio interference. Probes are provided for conducting exploratory interference tests, and matching and coupling networks are used to permit it to be used as a two-terminal RF microvoltmeter.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists basically of a superheterodyne receiver and a calibrated impulse noise generator which generates pulses exhibiting a stable and uniform spectrum throughout the range of the receiver, the peak value of which is adjustable to known values. The receiver is a six-band receiver with two tuned RF stages, a mixer, local oscillator, two IF stages, second detector, first audio

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.: Spec. MIL-T-10645(SigC) and Amendment 1.			
PROCUREM'T COG.: Army	DESIGN COG.: Army, CSL		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 5.1.3		
- Electronics Test Equipment -	AN/URM-3		

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RADIO INTERFERENCE MEASURING SET AN/URM-3

ELECTROMECHANICAL DESCRIPTION: (Continued)

and output stages. The output of the impulse generator is injected into the receiver antenna input circuit in such a manner that interference measurement is independent of antenna impedance.

Power Supply: 115 volts, ±10%, AC, single phase, 60 cycles per second; or 24 volts DC; or 12 volts DC.

Frequency Range: 0.15 to 0.4 and 1.6 to 40 megacycles per second in six bands. The ranges are 0.15 to 0.4, 1.6 to 3.0, 3.0 to 5.8, 5.8 to 11.0, 11.0 to 21.0, and 21.0 to 40.0 megacycles per second.

Voltage Range: 10 microvolts per megacycle to 31600 microvolts per megacycle.

Radio Noise Generator:

Pulse Duration: Approximately 0.01 microsecond.

Pulse Repetition Rate: 10 to 1000 pulses per second.

Pulse Amplitude: 0 to 90 decibels above one microvolt per megacycle or kilocycle bandwidth.

Spectrum: Flat to 40 megacycles per second within ±3 decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Designed by the Signal Corps Engineering Laboratories, Fort Monmouth, New Jersey.

TUBE COMPLEMENT:

R-178/URM-3: 1 JAN-OB2, 1 JAN-OA3/VR-75, 1 JAN-OC3/VR-105, 1 JAN-6AC7W, 1 JAN-6H6, 2 JAN-6SA7Y, 1 JAN-6SG7Y, 2 JAN-6SK7W, 1 JAN-6SQ7, 1 JAN-6V6GT.

TS-496/URM-3: 2 JAN-OA2, 1 JAN-OB3, 1 JAN-6J6, 1 JAN-5696.

REFERENCE DATA AND LITERATURE:

Preliminary Instruction Manual, 1 September 1950, Signal Corps Engineering Laboratories, Fort Monmouth, New Jersey.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

RADIO INTERFERENCE MEASURING SET AN/URM-3

EQUIPMENT SUPPLIED:

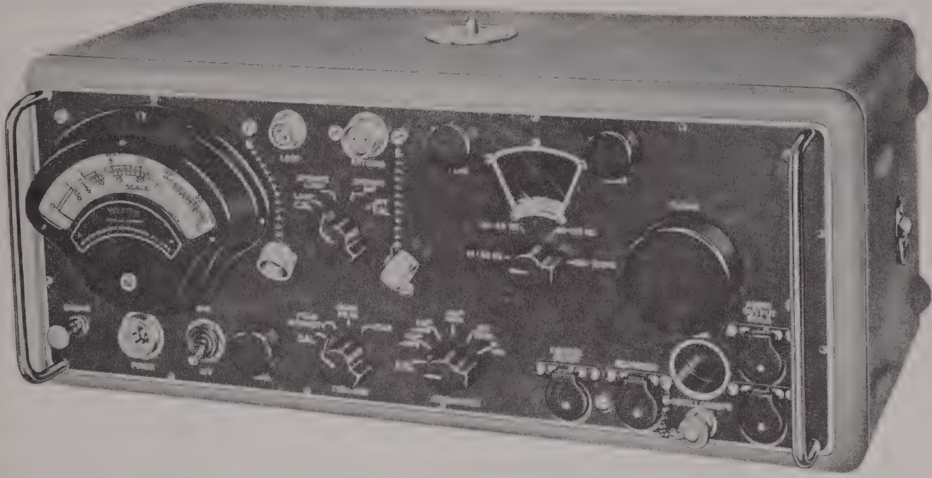
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set AN/URM-3			24-1/2	12	14-1/2	110
1	Mast Base AB-15/GR						
1	Antenna Bracket MT-195/URM-3						
1	Cable Assembly RG-55/U		3300-132335652	180 long			
1	Cable Assembly RG-55/U		3300-132335652	60 long			
1	Adapter UG-273/U		8850-102000				
1	Headset H-16/U						
1	Cord (Headset) CD-307						
1	Probe, Electric Field MX-839/URM-3						
1	Probe, Magnetic Field MX-838/URM-3						
1	Mast Section MS-116						
1	Mast Section MS-117						
1	Mast Section MS-118						
1	Cord (DC Power) CX-1063/URM-3						
1	Cord (AC Power) CX-1062/URM-3						

RADIO INTERFERENCE MEASURING SET AN/URM-3

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Coupler CU-149						
1	Coupler CU-150						
1	Coupler CU-153						
1	Coupler CU-151						
1	Coupler CU-152						
1	Adapter Connector UG-641/U						
1	Service Patch Cord						

RADIO TEST SET AN/URM-6



FUNCTIONAL DESCRIPTION:

A field and depot equipment used to measure the field intensity of a given radio transmission, to measure the intensity of radiated or conducted radio interference, or as a sensitive RF microvoltmeter within its frequency range. Two tripods are provided for mounting the large loop antenna and the superheterodyne receiver. Mounting provisions have been made on the receiver for either of two rod antennas and a small loop antenna. Signal monitoring provisions are available from panel-mounted headphones, oscilloscope, recorder, and remote meter jacks. Measurements are made using the panel-mounted meter or the remote meter and graphic recordings are made using the milliammeter-recorder. A calibration chart is furnished with the equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Stoddart Model NM-10A.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The power input goes through an isolation transformer with filters to keep extraneous power-line noises out of the instrument. Input devices include rod antennas, loop antennas, a line probe, and impedance matching networks. Meter indications must be modified by the pick-up factor of the antenna

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-801319-26325		
PROCUREM'T INFO.:	Spec. MIL-T-16202 (Ships) dated 1 April 1951		
PROCUREM'T COG.:	Navy	DESIGN COG.:	Navy, BuShips
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	5.1.3
	- Electronics Test Equipment -		AN/URM-6

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

ELECTROMECHANICAL DESCRIPTION: (Continued)

used. The receiver is a highly sensitive low frequency radio receiver which contains internal means for calibrating or standardizing its RF gain, thus permitting direct readings in indicated microvolts or microvolts per meter. Measurements can be made with the receiver in terms of the peak value of the signal or interference (the PEAK function), in terms of a weighted value (the QUASI-PEAK function), or in terms of the average value (the FIELD INTENSITY function).

The signal channel of the receiver resembles a conventional superheterodyne receiver in its RF, IF, and AF portions, but differs in its provision for attenuation and measurement of detector output. The RF signal is amplified in the RF stage and mixed with the local oscillator frequency in the mixer stage to produce an intermediate frequency. The IF signal is amplified in three IF stages and demodulated in the detector stage. The demodulated signal is acted upon by the meter detector weighting circuits and applied to the VTVM stage. The audio components are subsequently amplified and delivered to the headphone jacks.

Attenuator step ratio settings are built in the inputs of the RF, mixer, and IF stages.

Power Supply: 115 volts, ±10%, or 230 volts, ±10%, AC, single phase, 50 to 1600 cycles per second except for Milliammeter - Recorder which utilizes 60 cycles per second, 100 watts at 115 volts, 60 cycles. 3.0 volts, DC, supplied by two Battery, BA-30, for the Observer-Compass, Mark 1, Model O. A suitable battery pack can be used in place of the separate power supply, however, the Milliammeter-Recorder cannot be used.

Frequency Range: 14 to 250 kilocycles per second.

Intermediate Frequency: 12.5 kilocycles per second.

Audio Output: 100 milliwatts.

Audio Impedance: 600 ohms (headset).

Attenuator Setting: 0, 20, 40, 60, and 80 decibels.

Receiver Meter Scale: 0 to 100 microvolts, 0 to 40 decibels.

Voltage Range: 1 microvolt to 1 volt.

Field Intensity Range: 1 microvolt per meter to more than 1 volt per meter, depending on the antenna used.

Effective Bandwidth: 100 to 600 cycles per second at 6 decibels down, 2000 cycles per second at 60 decibels down.

Image Rejection: -50 decibels or better from signal level,

Intermediate Frequency Rejection: 60 decibels or better.

Signal-to-Noise Ratio: Unity or better.

Dynamic Range: 20 decibels at full scale.

Accuracy: Field Intensity Measurements, ±10% 10 microvolts per meter to 1 volt per meter.

MANUFACTURERS' OR CONTRACTORS' DATA:

Stoddart Aircraft Radio Company, 6644-C Santa Monica Boulevard, Hollywood 38, California; Contract No. NObsr-39263, 27 June 1947; Approximate Cost per Unit, $4800.00.

TUBE COMPLEMENT:

IM-36/URM-6: 1 JAN-6AL5, 1 JAN-6AT6, 6 JAN-6AU6, 1 JAN-6BE6, 3 JAN-6C4, 1 JAN-6E5, 1 JAN-6J6, 1 JAN-6X4, 1 JAN-NE2.

PP-449/URM-6: 1 JAN-5Y3GT, 1 JAN-NE32, 2 JAN-OC3/VR-105.

RADIO TEST SET AN/URM-6

REFERENCE DATA AND LITERATURE:

Navships 91196 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Radio Test Set AN/URM-6	26.2	25-1/2	37-1/2	47-1/2	297

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radio Test Set AN/URM-6		7CAC-801319-26325				
1	Radio Interference Field Intensity Meter IM-36/URM-6			8	19-13/16	10-3/8	26.00
1	Transit Case CY-706/URM-6	Plywood		14-1/2	10-7/8	34-1/2	30.00
1	Power Supply PP-449/URM-6			7-31/32	9-29/32	19-3/4	24.75
1	Antenna AT-203/URM-6			51 long			
1	Antenna AT-204/URM-6			84 long			
1	Antenna AT-205/URM-6				5 dia.		
1	Adapter UG-537/U		1800-298292755				
1	RF Cable Assembly CG-577/URM-6						
1	Power Cable Assembly CADV-62480			72 long			
1	Special Purpose Cable Assembly CADV-62481			120 long			
1	Chart PT-107/URM-6						

(Continued)

EQUIPMENT SUPPLIED: (Continued)

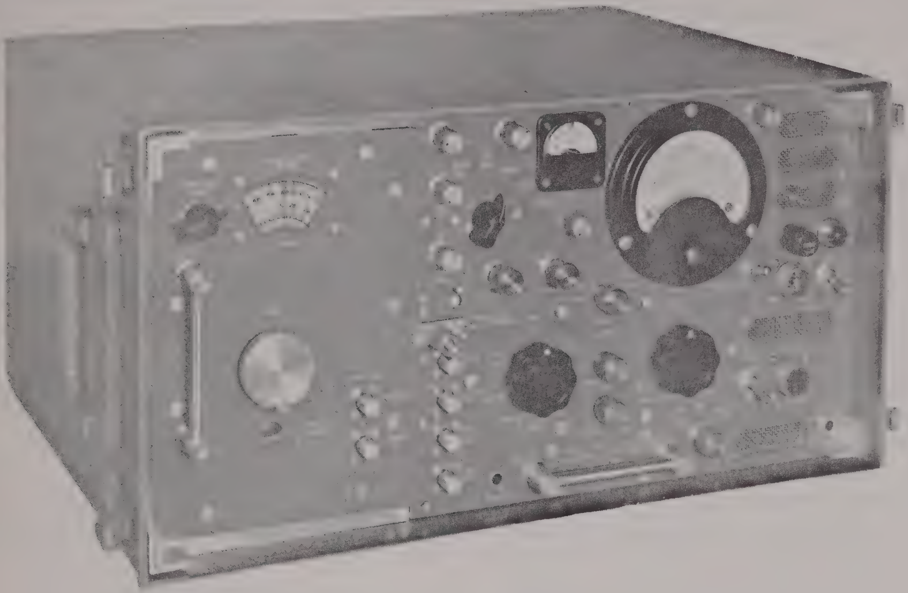
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Clipboard						
2	Instruction Book Navships 91196						
1	Headphone CW-49509						
1	Accessory Case CY-707/URM-6	Plywood		21-1/8	6-3/4	27-3/4	24.00
1	Observer-Compass with case Mark 1, Model O			4-3/4	10-7/8	4-7/8	4.75
1	Ammeter ME-31/U						
1	Antenna AT-207/URM-6						
1	RF Probe MX-951/URM-6						
1	Impedance Matching Network CU-184/URM-6						
1	Impedance Matching Network CU-185/URM-6						
1	Impedance Matching Network CU-186/URM-6						
1	Cord CG-444/U			240 long			
1	Special Purpose Cable Assembly CG-571/U			240 long			
1	Special Purpose Cable Assembly CG-572/U			240 long			
						(Continued)	

RADIO TEST SET AN/URM-6

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Special Purpose Cable Assembly CG-571/U			72 long			
1	Special Purpose Cable Assembly CADV-62482			24 long			
1	Special Purpose Cable Assembly CG-573/U			36 long			
1	Case (Recorder) CY-708/URM-6	Plywood		18	14	11	15.00
1	Milliammeter-Recorder with inking kit RD-59/U			13-1/4	8-9/16	8-3/4	
1	Power Cable Assembly CADV-62480			72 long			
1	Shoulder Strap						
1	Tripod Case CY-709/URM-6	Canvas		41-1/2	9-1/4 dia.		5.00
2	Tripod MT-674/U						
1	Loop Case CY-710/URM-6	Plywood		33-3/4	5	33-7/8	36.00
1	Antenna AT-206/URM-6				30 dia.		
1	Shoulder Strap						
						Total:	222.00

RADIO INTERFERENCE MEASURING SET AN/URM-7



FUNCTIONAL DESCRIPTION:

A general purpose, field radio interference and field intensity meter designed primarily for the measurement of broadband interference although it incorporates facilities for CW interference and field intensity measurement. Test set incorporates an impulse generator used as a noise reference standard, whose output is calibrated in terms of microvolts per unit bandwidth. The visual output indicator is a peak reading vacuum tube voltmeter with a logarithmic scale calibrated in microvolts and a linear decibel scale calibrated in terms of decibels above one microvolt per megacycle. Probes are provided for conducting exploratory interference tests, and coupling networks are used to permit the test set to be used as a two-terminal noise-microvoltmeter.

RELATIONSHIP TO OTHER EQUIPMENT:

AN/URM-7 is similar to Empire Devices, Inc. Commercial Model NF-105.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.: Army Spec. SCL-1170			
PROCUREM'T COG.: Army		DESIGN COG.: Army, CSL	
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 5.1.3		
- Electronics Test Equipment -			AN/URM-7

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RADIO INTERFERENCE MEASURING SET AN/URM-7

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The impulse generator output is injected into the input circuit of the tuner in such a manner as to permit measurement of open circuited antenna terminal voltage on a per megacycle basis. The tuner utilizes a superheterodyne circuit. The frequency range is covered by means of two plug-in type RF heads. The logarithmic scale characteristic of the output indicator is achieved through tapered pole-pieces in the indicating meter movement, which eliminates the necessity of using automatic gain control. The dipole antenna, used for field intensity measurement applications, can be resonated at each test frequency. The broadband antenna is used in suppression test applications where the antenna must be placed close to the source of interference.

Power Supply: 115 volts ±10%, AC, single phase, 50 to 400 cycles, 100-volt-amperes; or 24 volts, DC; or 12 volts, DC.

Frequency Range: 20 to 200 megacycles, 200 to 400 megacycles.

Intermediate Frequency Range: 10.7 megacycles, 30 megacycles.

Voltage Range: 12 microvolts per megacycle to 1,200,000 microvolts per megacycle (for 20 to 200 megacycles).
6 microvolts per megacycle to 5,000,000 microvolts per megacycle (for 200 to 400 megacycles).

Indicating Meter Scale: 0.5 to 10 microvolts.
-6 to +20 decibels (10 decibel scale expansion is provided for scale overlap).

Calibration Standards:
- (a) Spot frequency sine wave generator.
- (b) Broadband impulse noise generator (output externally available).
  Pulse duration: 5×10^{-4} microseconds.
  Pulse Repetition Rate: 2.5 to 2500 pulses per second.
  Pulse Amplitude: 47 to 97 decibels above one microvolt per megacycle bandwidth.
  Spectrum: Flat to 100 megacycles within ±1/2 decibels.

Accuracy: ±10%, voltage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Empire Devices, Inc., 38-25 Bell Boulevard, Bayside, New York, Contract No. W36-039-sc-38120; Approximate Cost per Unit, $4650.00, 1953.

TUBE COMPLEMENT:

8 JAN-6BJ6, 4 JAN-12AT7, 3 JAN-12AU7, 5 JAN-6X4, 1 JAN-OA2, 5 JAN-6AK5, 1 JAN-6AL5, 1 JAN-6AB4, 1 JAN-6J6, 1 JAN-6F4, 1 JAN-5876, 1 JAN-1N21B (Crystal), 1 JAN-1N34 (Crystal).

REFERENCE DATA AND LITERATURE:

RADIO INTERFERENCE MEASURING SET AN/URM-7

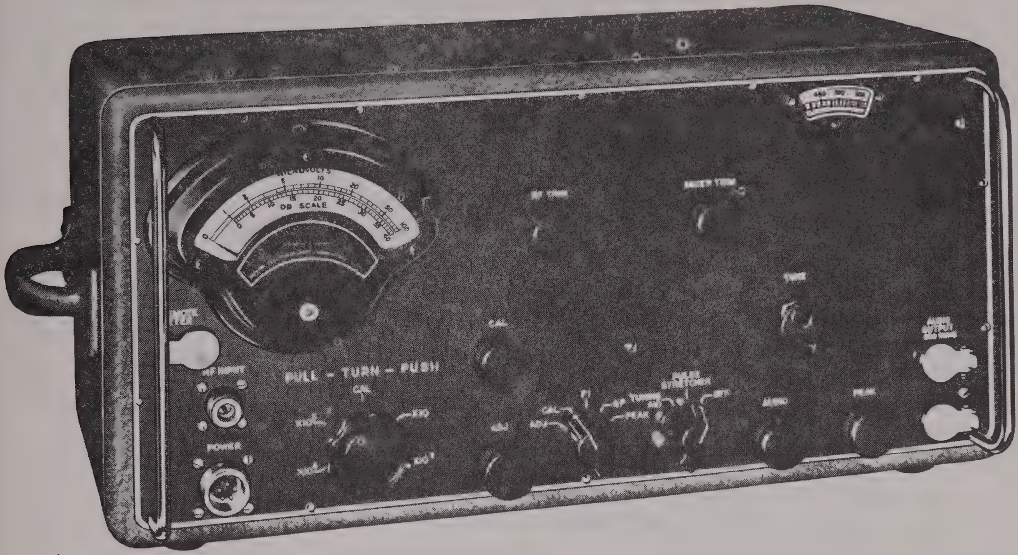
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radio Interference Measuring Set, AN/URM-7			9-1/2	18-3/4	14-5/8	65
1	Carrying Case (Spare)						
1	Accessory Carrying Case						
1	Dipole Antenna Set						
1	Tripod						
1	Line Probe (50 ohms)						
1	Magnetic-Field Probe						
1	Electric-Field Probe						
1	Balanced Injection Block						
1	Unbalanced Injection Block						
2	RF Cable			360 long			
1	Power Line Cord						
1	Earphones						
1	Alignment Harness						
1	Operation Manual						

RADIO TEST SET AN/URM-17



FUNCTIONAL DESCRIPTION:

A field and depot equipment used for intensity measurements of all types of radio-frequency energy in the radio frequency spectrum. It contains internal means for calibrating or standardizing its gain. Measurements can be made with the receiver in terms of the peak value of the interference (the PEAK function), in terms of a weighted value (the QUASI-PEAK function), or in terms of the average value (the FIELD INTENSITY function). The indicating meter scale on the panel is directly calibrated for a two decade, approximately logarithmic range of 1 to 100 micro-volts, and an approximately linear 0 to 40 decibel range. Charts provided with the equipment show actual effective bandwidth versus frequency.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Stoddart Model NM-50A.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-801319-254145		
PROCUREM'T INFO.:	Spec. MIL-T-16870 (Ships) dated 6 December 1951.		
PROCUREM'T COG.:	Navy	DESIGN COG.:	Navy, BuShips
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	5.1.3
	- Electronics Test Equipment -		AN/URM-17

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The signal channel closely resembles a superheterodyne receiver in its RF, IF, and AF portions, but differs from most superheterodyne receivers in its provision for attenuation and measurement of detector output.

The RF signal as picked up by the antenna or probe is delivered to the RF input receptacle and passes through the RF stage. It is then mixed with the local oscillator frequency in the mixer stage, to produce the intermediate frequency. The IF signal is amplified in six IF stages and demodulated in the detector stage. The demodulated signal is acted upon by the meter detector weighing circuits and applied to the VTVM stage, thus actuating the meter. The audio components are subsequently amplified and delivered to the headphone jacks.

Power Supply: 115 volts, ±10%, AC, or 230 volts, ±10%, AC, single phase, 50 to 1600 cycles per second, 110 watts at 115 volts or a suitable battery pack used in place of the separate power supply.

Frequency Range: 375 to 1000 megacycles per second.

Intermediate Frequency: 60 megacycles per second.

Input Impedance: 50 ohms.

Attenuator Steps: 60 decibels to 140 decibels.

Effective Bandwidth: Approximately 1.8 megacycles at signal of 1000 megacycles to 1.0 megacycles at signal of 370 megacycles.

Image Rejection: 40 decibels or better.

Spurious Response Rejection: 40 decibels or better.

Intermediate Frequency Rejection: Better than 60 decibels.

Voltage Range: 100 microvolts to 10 volts.

Field Intensity Range: 100 microvolts per meter to 100 volts per meter.

Signal-to-Noise Ratio: Unity or better based on an equipment sensitivity of 10 microvolts as a two-terminal voltmeter.

Audio Output: 100 milliwatts or better.

Audio Output Impedance: 600 ohms.

Dynamic Range: 20 decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Stoddart Aircraft Radio Company, 6644 Santa Monica Boulevard, Hollywood 38, California; Contract No. NObsr-42430; 30 June 1948.

TUBE COMPLEMENT:

IM-52/URM-17: 2 JAN-6AL5, 1 JAN-6AR5, 7 JAN-6BH6, 2 JAN-6C4, 2 JAN-6F4, 1 JAN-9005, 1 JAN-12AU7, 1 JAN-1N21B (Crystal Rectifier).

PP-530/URM-17: 1 JAN-6AS7G, 1 JAN-6BH6, 1 JAN-NE-32.

REFERENCE DATA AND LITERATURE:

Navships 91388 (Instruction Book).

RADIO TEST SET AN/URM-17

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Radio Test Set, AN/URM-17	8.3	18-1/4	43-1/2	19	170

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radio Test Set AN/URM-17 Including:		7CAC-801319-254145				
1	Radio Interference Field Intensity Meter IM-52/URM-17			9-3/16	19-3/16	10-3/8	30
1	Transit Case CY-866/URM-17	Plywood		16-1/4	23-3/4	10-7/8	25
1	Chart Set PT-210/URM-17						
2	Instruction Book Navships 91388						
1	Accessory Case CY-865/URM-17	Plywood		14-5/8	15-1/2	10-1/8	17
1	Power Supply PP-530/URM-17			7-31/32	9-29/32	19-3/4	16
1	Antenna AT-255/URM-17	Brass	F16-A45194-7901	5-1/2 (extends to 16)			
1	RF Probe DT-56/URM-17		N16-P-87008-4021	2-31/32 long	9/16 OD		
1	Impedance Matching Network CU-227/URM-17		N16-N-30826-1073	2-31/32 long	9/16 OD		

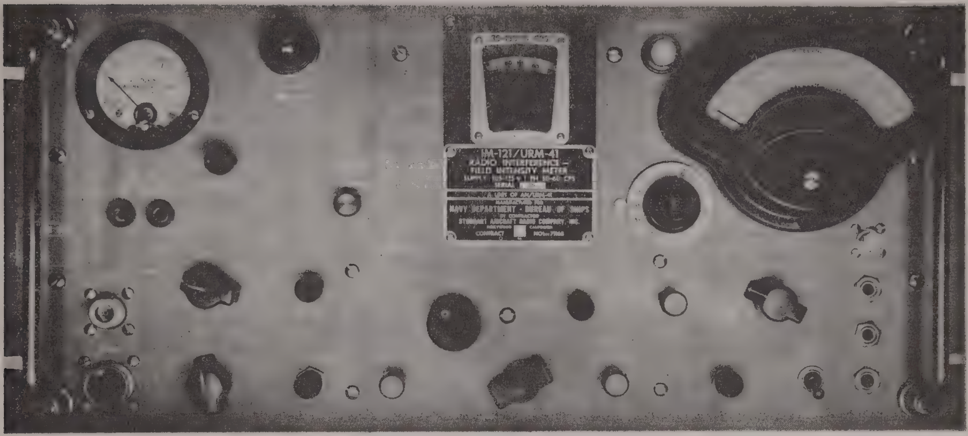
(Continued)

RADIO TEST SET AN/URM-17

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Power Cable Assembly CADV-62480			72 long			
1	Special Purpose Cable Assembly CADV-62481		N17-C-48703-5521	120 long			
1	RF Cable Assembly CG-678/U		N16-C-11957-3021	240 long			
1	Glow Lamp JAN-NE-32 (Spare)		2Z5889-8				
1	Ballast Lamp (Spare)		N16-R-85001-1511				
1	Cable Connector (20 ohms)			1-11/16 long	53/64 OD		
1	Tripod Bag CW-218/URM-17	Canvas		39-3/4 high	6-1/4 dia.		3.25
1	Tripod Navy Type-10545	Wood	N16-T-802001-107	37-1/2 (extends to 60)			
1	Antenna Mast Section AB-189/URM-17			36-1/8 long	1 dia.		
1	Azimuth Dial Assembly	Aluminum	N16-I-21801-1045	3 long	2-1/4 dia.		
1	Azimuth Dial Pointer		N16-K-701645-401	3/4 long	2 dia.		
						Total:	109.25

FIELD INTENSITY METER AN/URM-41


NM-121/URM-41
RADIO INTERFERENCE - FIELD INTENSITY METER
NAVY DEPARTMENT · BUREAU OF SHIPS

FUNCTIONAL DESCRIPTION:

A portable, general purpose, very low frequency radio interference and field intensity measuring instrument designed for use during interference or field strength surveys to determine the source and magnitude of radiated or conducted signals. Separate analysis of magnetic and electric fields may be made. The instrument may also be used as an ultra-sensitive audio frequency microvoltmeter. Signals may be measured in quasi-peak, average, or true peak values.

RELATIONSHIP TO OTHER EQUIPMENT:

The AN/URM-41 is the military equivalent of the Stoddart Radio Interference Field Intensity Meter NM-40A.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The field intensity meter consists fundamentally of two types

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.: Contract NObsr-71168			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5. 1. 3	
	- Electronics Test Equipment -		AN/URM-41

FIELD INTENSITY METER AN/URM-41

ELECTROMECHANICAL DESCRIPTION:

of receivers, one selective and the other wideband. In selective operation the set functions as a tunable superhetrodyne receiver. The set incorporates an untuned radio frequency amplifier, a low-pass filter, an intermediate frequency amplifier having an adjustable bandwidth, an amplifier employing an automatic gain control to obtain logarithmic action, and detector and indicating circuits. The detector circuit time constant provides RMS indication of the signal. When the test set is used as a wideband receiver the same radio frequency amplifier is used to feed signals through wideband amplifiers to the detector and metering circuits. In wideband operation the signal bypasses the selective intermediate frequency amplifiers. The detector circuits are weighted to provide average, quasi-peak or peak analysis of signals. Audio and video outputs are obtained from jacks located on the front panel.

Power Supply: 105 to 125 volts, AC, single-phase, 50 to 60 cycles per second, 250 volt-amperes.

Selective Frequency Range: 30 cycles per second to 15 kilocycles per second.

Wideband Frequency Range: Output flat from 100 cycles per second to 15 kilocycles per second. Output 6 decibels down at approximately 150 kilocycles per second. Correction curve supplied for frequencies 30 to 200 cycles per second.

Input Impedance: 50, 600, 10, 000 and 100, 000 ohms.

Intermediate Frequency: 25 kilocycles per second.

Selectivity: Effective noise bandwidth 9. 0 to 60 cycles per second, 6 decibel bandwidth 13 to 90 cycles per second, 40 decibel bandwidth 60 to 500 cycles per second.

Image Rejection: 60 decibels or greater.

Spurious Response Rejection: 55 decibels or better.

Intermediate Frequency Rejection: 60 decibels or better.

Selective Sensitivity: (As an asymetrical voltmeter, narrowest bandwidth, detector in average function, and 10, 000 ohm input impedance).

Frequency Range	Signal Measurable for a 20 decibel Signal/Noise Ratio
30 to 300 cycles per second	10 microvolts
300 to 1000 cycles per second	2. 5 microvolts
1000 to 15, 000 cycles per second	1. 5 microvolts

Full Scale Sensitivity: 10 microvolts, unattenuated.

Wideband Sensitivity: 100 microvolts full scale deflection with no attenuation and 100, 000 ohm input impedance, detector in average function; 150 microvolts for a 20 decibel signal to noise ratio, maximum.

Selective Meter Indication: Two decade logarithmic calibrated 0. 1 to 10. 0 microvolts.

Wideband Operation Meter Indication: Single decade, linear scale, suppressed zero.

FIELD INTENSITY METER AN/URM-41

ELECTROMECHANICAL DESCRIPTION: (Continued)

Attenuation: 100 decibels in 5 decades.

Audio Output: 100 milliwatts minimum into 600 ohms with full scale signal and BFO on.

Wideband Dynamic Range: Approximately 28 decibels above full scale deflection for quasi-peak operation.

Loop Sensitivity: 10 microvolts meter indication for an equivalent radiated field of 400 microvolts per meter at 1000 cycles per second. Frequency/amplitude response is proportionial to frequency.

Probe Sensitivity: Voltage reading of 10 microvolts for an electric field of 200 microvolts per meter. Response flat with frequency.

Calibrator:

Type: 400 cycle per second tuning fork.

Stability: ±0.2% total deviation for a temperature change of -15° C to +50° C.

MANUFACTURERS' OR CONTRACTORS' DATA:

Stoddart Aircraft Radio Company, Incorporated, 6644 Santa Monica Boulevard, Hollywood 38, California; Contract No. NObsr-71168.

TUBE COMPLEMENT:

3 5751, 3 5814, 3 5879, 2 5726, 6 6AU6, 2 6AQ5W, 9 5725, 3 6072, 3 6C4W, 1 5R4WGA, 1 6080, 1 5651, 2 12AT7WA.

REFERENCE DATA AND LITERATURE:

Technical Manual for Radio Interference-Field Intensity Meter AN/URM-41 NavShips 92739.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

FIELD INTENSITY METER AN/URM-41

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Field Intensity Meter AN/URM-41 Including:						
1	IM-121/URM-41 Radio Interference Measuring Set						
1	Power Supply 91182-2						
1	Cable Assembly Power, Electrical 91258-1						
1	Cable Assembly Power, Electrical 91186-2						
1	Capacitive Probe 91183-2						
1	Support, Test Prod. (Capacitive Probe Mounting Assembly) 90689-2						
1	Cable Assembly, Capacitive Probe 91185-2						
1	Loop Antenna 90117-2						
1	Loop Cable Assembly 90048-2						

(Continued)

FIELD INTENSITY METER AN/URM-41

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Tripod 90095-2						
1	Coupler, Antenna 91184-2						
1	Case, Radio Interference Measuring Set 91187-2						
1	Antenna (for use with capacitive probe) 91299-2						
1	Case, Power Supply 91188-2						
1	Radio Frequency Cable Assembly 90757-2						
1	Headphones, Crystal 91384-2						
1	Headphones, 600 ohms 10796						
1	Remote Meter						
1	Special Purpose Cable Assembly (for remote meter) 90075-2						
1	Chart Set 91190-2						
1	Tripod Bag 90186-2						

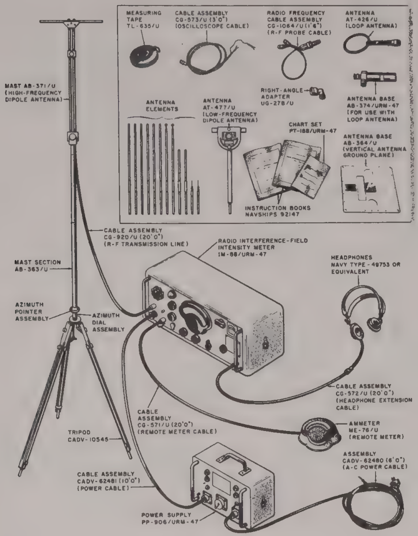
(Continued)

FIELD INTENSITY METER AN/URM-41

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Special Purpose Cable Assembly (Headphone extension) 90074-1						
1	Milliameter-Recorder 90097-2						
1	Special Purpose Cable Assembly Recorder Cable 90075-1						
1	Special Purpose Cable Assembly (use with Oscilloscope) 90075-1						
1	Lead, Test (Capacitive probe calibration cable; two conductors; 18 inches) 91298-1						
1	Lead, Test (Capacitive probe calibration cable; one conductor; 18 inches) 91287-1						
1	Case, Accessories (Loop case) 91189-2						
2	Instruction Book NavShips 92739						

RADIO INTERFERENCE MEASURING SET AN/URM-47


MEASURING TAPE TL-635/U
CABLE ASSEMBLY CG-573/U (3'0") (OSCILLOSCOPE CABLE)
RADIO FREQUENCY CABLE ASSEMBLY CG-1064/U (1'6") (R-F PROBE CABLE)
ANTENNA AT-426/U (LOOP ANTENNA)
MAST AB-371/U (HIGH-FREQUENCY DIPOLE ANTENNA)
RIGHT-ANGLE ADAPTER UG-278/U
ANTENNA BASE AB-374/URM-47 (FOR USE WITH LOOP ANTENNA)
ANTENNA ELEMENTS
ANTENNA AT-477/U (LOW-FREQUENCY DIPOLE ANTENNA)
CHART SET PT-188/URM-47
ANTENNA BASE AB-364/U (VERTICAL ANTENNA GROUND PLANE)
INSTRUCTION BOOKS NAVSHIPS 92147
CABLE ASSEMBLY CG-920/U (20'0") (R-F TRANSMISSION LINE)
RADIO INTERFERENCE-FIELD INTENSITY METER IM-88/URM-47
MAST SECTION AB-363/U
HEADPHONES NAVY TYPE - 49753 OR EQUIVALENT
AZIMUTH POINTER ASSEMBLY
AZIMUTH DIAL ASSEMBLY
CABLE ASSEMBLY CG-572/U (20'0") (HEADPHONE EXTENSION CABLE)
CABLE ASSEMBLY CG-571/U (20'0") (REMOTE METER CABLE)
AMMETER ME-76/U (REMOTE METER)
TRIPOD CADV-10545
ASSEMBLY CADV-62480 (6'0") (A-C POWER CABLE)
CABLE ASSEMBLY CADV-62481 (10'0") (POWER CABLE)
POWER SUPPLY PP-906/URM-47

FUNCTIONAL DESCRIPTION:

A general purpose, highly sensitive, HF and VHF, superheterodyne receiver used to locate and measure radio interference and field intensities. In addition, it is used to adjust directive antennas and to explore radiation patterns, where the field intensity may vary over a wide range of values. The main component of the set is a selective, two-terminal voltmeter designed to measure RF interference or the intensity of radiated or conducted RF signals. The equipment also contains a power supply and antennas for signal pickup.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A calibrated meter, a function switch, and dipole antennas make it possible to make qualitative measurements of the intensity of radio

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.			
PROCUREM'T INFO.: Spec. MIL-STD-125			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5. 1. 3	
	- Electronics Test Equipment -		AN/URM-47

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RADIO INTERFERENCE MEASURING SET AN/URM-47

ELECTROMECHANICAL DESCRIPTION: (Continued)

signals and interference. By proper adjustment of the function switch, the meter will record the peak, weighted, or average value of the signal picked up by the antennas. A beat frequency oscillator facilitates the accurate tuning of weak signals. By observing the zero beat note or audio null of the oscillator, the strength of the weak signal can be accurately measured.

Power Supply: 105 to 125 volts or 210 to 250 volts, AC, 50 to 1000 cycles per second, single phase.
Frequency Range: 20 to 400 megacycles per second.
Frequency Calibration Accuracy: ±2%.
Meter Calibrations: 1 to 100 microvolts; 0 to 40 decibels.
Meter Accuracy: ±1%.
Input Impedance: 50 ohms.
Type of Receiver: Superheterodyne.
Sensitivity: 1 to 60 microvolts per meter.
Spurious Response Rejection: Greater than 40 decibels.
IR Rejection: Greater than 60 decibels.
Audio Output: 100 millivolts into 600 ohm, noninductive load.
Oscilloscope Output: Frequency response flat within 3 decibels from 20 to 100,000 cycles per second depending upon scope loading.

MANUFACTURERS' OR CONTRACTORS' DATA:

Stoddart Aircraft Radio Company, Hollywood 38, California; Navy Contract NObsr-52301, 26 March 1951.

TUBE COMPLEMENT:

1 JAN-OA2, 1 JAN-OB2, 1 JAN-1N63, 1 JAN-5R4GY, 1 JAN-5651, 1 JAN-5718, 1 JAN-5726, 2 JAN-5814, 4 JAN-5840, 2 JAN-6AU6WA, 6 JAN-6BH6, 1 JAN-6AQ5, 1 JAN-6080, 4 JAN-6135.

REFERENCE DATA AND LITERATURE:

NAVSHIPS Instruction Book 92147.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Radio Interference Measuring Set AN/URM-47	13.9	18-7/8	48-3/4	26-1/4	212

RADIO INTERFERENCE MEASURING SET AN/URM-47

EQUIPMENT SUPPLIED:

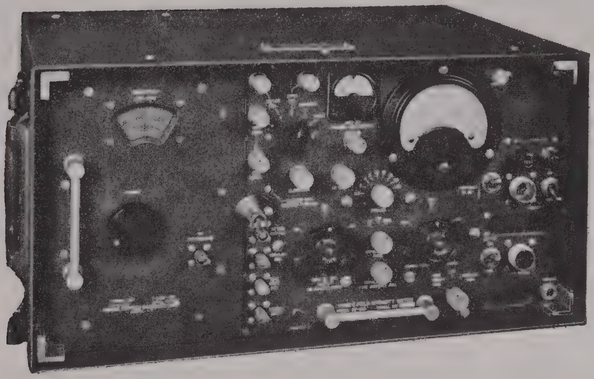
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radio Interference Measuring Set AN/URM-47						
	Consisting of:						
1	Test Case CY-1527/URM-47 Containing:			13-1/2	23-3/4	11-5/16	50
1	RI-FI Meter IM-88/URM-47			7-5/8	19-13/16	10-3/8	
1	Headphone (GFE) Navy Type 49753						
2	Chart Set PT-188/URM-47						
2	Instruction Book NavShips 92147			11	8-1/2		
1	Accessories Case CY-1525/URM-47			16-1/8	15-1/2	10-5/8	46
	Containing:						
1	Power Supply PP-906/URM-47			7-17/32	10-1/2	8-3/8	
1	Ammeter ME-76/U						
1	Antenna Base AB-364/U						
1	RF Cable Assy. CG-1064/U						
1	Assembly CADV-62480						
1	Combination Cable Assembly						
1	Antenna Case CY-1526/URM-47 Containing:						

(Continued)

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Mast AB-371/U						
1	Antenna AT-477/U						
2	Mast Section AB-363/U						
1	Tripod CADV-10545						
1	Antenna AT-426/U						
1	Antenna Base AB-374/URM-47						
1	Measuring Tape TL-635/U						
1	Rt. Angle Adapter UG-27B/U		8850-108716				
1	Azimuth Dial Assembly						
1	Azimuth Pointer Assembly						
1	Antenna Elements Set						
						Total:	132

NOISE AND FIELD INTENSITY METER
MODEL NF-105
(Empire Devices Products Corporation)



FUNCTIONAL DESCRIPTION:

A general purpose equipment used to detect and measure the intensity of radio frequency signals. The instrument is used for field intensity measurements, radio frequency interference measurements, antenna pattern measurements, and determining the harmonic output of oscillators used in transmitters and receivers. Carrier or peak measurements of continuous wave signals are indicated on a meter calibrated in microvolts and decibels above a microvolt. Peak indication of broadband signals is achieved by direct indication or by the aural slide-back method. Broadband interference is indicated in microvolts per megacycle (or per kilocycle) of bandwidth.

RELATIONSHIP TO OTHER EQUIPMENT:

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	5.1.3

NOISE AND FIELD INTENSITY METER
MODEL NF-105
(Empire Devices Products Corporation)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The instrument consists of a basic measuring unit and four interchangeable plug-in tuning units. The basic measuring unit contains the circuits which are common to all frequency ranges of the equipment. These include the vacuum tube voltmeter, sine-wave calibrator, impulse generator, audio amplifier, power supplies and attenuators. The radio frequency and the intermediate frequency circuits are contained in the tuning units. A 12 inch loop antenna or vertical pickup rod is used for measurements in the 150 kilocycles per second to 30 megacycles per second range. A broadband antenna or dipole antennas with matching balun transformers are used for measurements in the range from 20 to 1000 megacycles per second. A clamp-on probe or a 50- or 500- ohm line probe is used for conducted measurements.

Power Supply: 115 volts, AC, 50 to 400 cycles per second, 100 volt-amperes.

Tuning Unit A:
  Frequency Range: 150 kilocycles per second to 30 megacycles per second in 6 bands.
  Intermediate Frequency: 455 and 1600 kilocycles per second.
  Full Scale Sensitivity: 1 microvolt maximum.
  Noise Bandwidth: 10 kilocycles per second.

Tuning Unit 1:
  Frequency Range: 20 to 200 megacycles per second in 2 bands.
  Intermediate Frequency: 10.7 megacycles per second.
  Full Scale Sensitivity: 10 microvolts maximum.
  Noise Bandwidth: 100 kilocycles per second.

Tuning Unit 2:
  Frequency Range: 200 to 400 megacycles per second continuous.
  Intermediate Frequency: 30 megacycles per second.
  Full Scale Sensitivity: 10 microvolts maximum.
  Noise Bandwidth: 200 kilocycles per second.

Tuning Unit 3:
  Frequency Range: 400 to 1000 megacycles per second in 2 bands.
  Intermediate Frequency: 300 kilocycles per second.
  Full Scale Sensitivity: 10 microvolts maximum.
  Noise Bandwidth: 300 kilocycles per second.

Narrow Band Voltage Measurement Range: 1 to 100,000 microvolts.

Broadband Voltage Measurement Range: 1 microvolt divided by the bandwidth in megacycles per second to 100,000 microvolts divided by the bandwidth in megacycles per second (microvolts per megacycle).

Input Impedance: 50 ohms.

Impulse Noise Generator:
  Frequency: Flat to 1000 megacycles per second, ±0.5 decibel.

NOISE AND FIELD INTENSITY METER
MODEL NF-105
(Empire Devices Products Corporation)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Pulse Repetition Rate: 2.5 to 2500 pulses per second.

Peak Output: Variable 37 to 97 decibels above 1 microvolt per megacycle bandwidth.

Meter Calibration: 0.5 to 10 microvolts, -6 to +20 decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Empire Devices Products Corporation, Amsterdam, New York, Approximate Cost per Unit, $9100.00.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Catolog.

SHIPPING DATA:

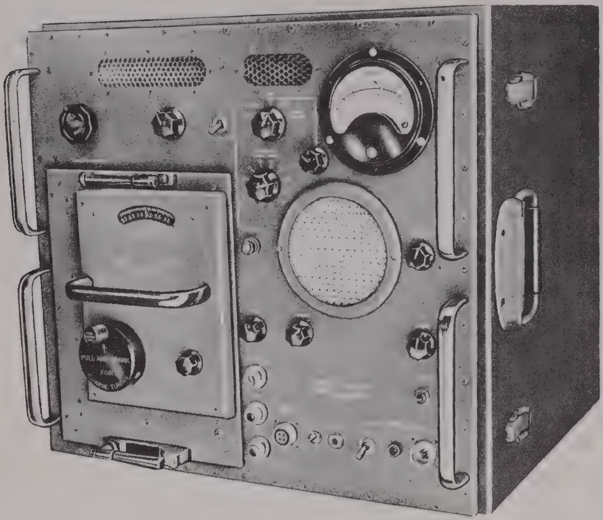
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Noise and Field Intensity Meter Empire NF-105					

NOISE AND FIELD INTENSITY METER
MODEL NF-105
(Empire Devices Products Corporation)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Noise and Field Intensity Meter Empire NF-105			9-1/2	18-3/4	14-5/8	
1	Basic Measuring Unit, Empire BA-105						
1	Tuning Unit, Empire T-A/NF-105						
1	Tuning Unit, Empire T-1/NF-105						
1	Tuning Unit, Empire T-2/NF-105						
1	Tuning Unit, Empire T-3/NF-105						
1	Standard Accessory Kit, Empire KT-105-D						

FIELD INTENSITY METER
MODEL NF-112
(Empire Devices Products Corporation)



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument designed for field intensity and RF interference measurements in the frequency range of 1.0 to 10.0 kilomegacycles. The instrument may also be used for antenna pattern analysis, determination of harmonic or spurious frequency output of transmitters, receiver local oscillator radiation measurements, determination of shielding effectiveness, and may be used as a tunable sensitive null detector or sensitive RF vacuum tube voltmeter. Test results are indicated on a meter located on the front panel of the instrument. Carrier or peak measurements of CW signals are indicated in microvolts, and decibels above 1 microvolt. Broadband interference is indicated directly in microvolts per megacycle bandwidth. Peak indication of broadband signals is achieved by direct meter reading or by the aural slide-back method.

RELATIONSHIP TO OTHER EQUIPMENT:

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5.1.3	
	- Electronics Test Equipment -		Empire NF-112

FIELD INTENSITY METER
MODEL NF-112
(Empire Devices Products Corporation)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The equipment consists basically of a superhetrodyne receiver, calibrating circuits, and indicators. The unit covers the frequency range by means of four plug-in RF tuners. The circuits common to all frequency ranges (i. e., intermediate amplifiers, vacuum tube voltmeter, impulse generator, detectors, audio amplifiers, and power supply), are housed in the basic measuring unit. An impulse generator producing a flat spectrum throughout the frequency range of the instrument serves as the calibrator. A single multiposition coaxial resistive step attenuator provides RF and IF attenuation. The instrument incorporates double tuned cavities preceding the first mixer; thus, reducing the possibility of pulse overload and cross modulation.

Power Supply: 115 volts, AC, 50 to 450 cycles per second.

Frequency Range: 1. 0 to 10. 0 kilomegacycles in four bands.

Voltage Range:

Carrier Intensity: 10. 0 microvolts to 10. 0 volts.

Effective Noise Bandwidth: 1. 0 and 5. 0 megacycles per second.

Input Impedance: 50 ohms.

Impulse Noise Generator:

Frequency: Flat to 10. 0 kilomegacycles within ±0. 5 decibel.

Pulse Repetition Rate: 1000 cycles per second.

Peak Output: 73 decibels above 1. 0 microvolt per megacycle bandwidth.

Indicating Meter: 4. 5-inch logarithmic movement calibrated 5 to 100 microvolts and +14 to 40 decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Empire Devices Products Corporation, Amsterdam, New York.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog No. F-958.

SHIPPING DATA:

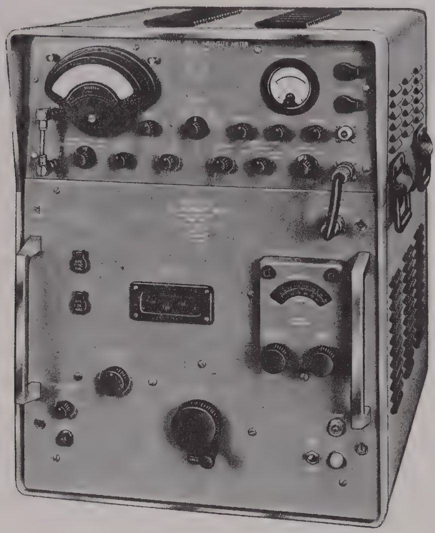
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

FIELD INTENSITY METER
MODEL NF-112
(Empire Devices Products Corporation)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Basic Measuring Unit BA-112			15	19	15	120
1	Tuning Unit No. 1,1.0 to 2.0 kmc T-1/NF-112						
1	Tuning Unit No. 2, 2.0 to 4.0 kmc T-2/NF-112						
1	Tuning Unit No. 3, 4.0 to 7.0 kmc T-3/NF-112						
1	Tuning Unit No. 4, 7.0 to 10.0 kmc T-4/NF-112						

FIELD INTENSITY METER
MODEL FIM
(Polarad Electronics Corporation)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, field intensity meter designed for locating and measuring radio frequency interference and making field intensity measurements in the frequency range of 1.0 kilomegacycles to 10.0 kilomegacycles. The FIM can be used to determine the source and magnitude of radiated or conducted interference. The equipment can also be used for adjusting directive antennas, exploring radiation patterns, intermediate frequency attenuator measurements, standing wave ratio measurements, insertion losses where field intensity may vary over a wide range of values. Measurements can be made in terms of average, quasi-peak, or peak value of the signal. In addition to providing circuitry for calibrating or standardizing its gain for precalibrated measurements, the test set also provides a means of accurately measuring the average value of a signal by the direct signal substitution method. Detection of an unmodulated signal is aided by the use of an audio frequency oscillator modulating the incoming signal. Detected signals are audibly monitored by the use of headphones.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.:	Commercial
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	5.1.3
	- Electronics Test Equipment -		Polarad FIM

FIELD INTENSITY METER
MODEL FIM
(Polarad Electronics Corporation)

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set is basically a frequency-selective voltmeter employing a triple conversion superhetrodyne receiver. The equipment consists of three major units: a monitor unit (FIM-B); four plug-in tuning units (FIM-L-S-M and -X); and a power unit (FIM-P). The monitor unit consists of the control and monitoring portion of the FIM. The lower section of the monitor unit is designed to accept any of the four tuning units. The four tuning units cover the entire frequency range of the receiver and provide single-dial, direct-reading, continuous frequency tuning with automatically tracked repeller voltages. The power unit contains the high- and low-voltage supplies necessary for operation of the equipment.

Power Supply: 115 volts ±10%, AC, 50 to 450 cycles per second, single-phase, 700 watts.

Frequency Range: Band 1: 1. 00 to 2. 24 kilomegacycles per second. Band 2: 2. 14 to 4. 34 kilomegacycles per second. Band 3: 4. 20 to 7. 74 kilomegacycles per second. Band 4: 7. 36 to 10. 00 kilomegacycles per second.

Frequency Calibration Accuracy: Better than ±1. 0%.

Input RF Voltage Range: 20 microvolts to 3 volts.

Input Impedance: 50 ohms nominal.

Bandwidth: 5. 0 ±0. 5 megacycles per second at -6 decibels.

Impulse Bandwidth: 5. 0 megacycles per second.

Image and Spurious Response Rejection: Better than 60 decibels.

Signal Attenuation Range: 0 to 80 decibels in 20 decibel steps, 60 decibels RF, 20 decibels IF.

Intermediate Frequencies: First, 260 megacycles per second; second, 140 megacycles per second; third, 40 megacycles per second.

Weighting Circuit Time Constants:

Average and Peak Measurements: 0. 1 ±0. 05 microsecond, charge; 0. 3 ±0. 03 microsecond, discharge.

Quasi-peak Measurements: 50 ±10 microseconds, charge; 500 ±100 milliseconds, discharge.

Audio Output: 100 milliwatts minimum into 600 ohms.

Video Output: 0. 5 volt minimum across 2 megohms.

Recorder Output: 0 to 1 milliampere, 1500 ohms.

Calibration Signal (CW): 0. 2 volt to 5 microvolts, rms; 0 to -95 decibels below a milliwatt.

MANUFACTURERS' OR CONTRACTORS' DATA:

Polarad Electronics Corporation, 4320 34th Street, Long Island City 1, New York; Approximate Cost per Unit, $19, 464. 00.

FIELD INTENSITY METER
MODEL FIM
(Polarad Electronics Corporation)

TUBE COMPEMENT:

1 OA2, 3 OB2 6 5R4WGA, 1 6AN5, 10 6AU6, 9 6X4, 3 12AT7, 1 5814, 4 OA3/VR75, 12 6AK5, 4 5721 or 6390, 1 5722, 1 6AL5, 2 5751, 2 5836, 2 5837, 2 5876, 1 5933, 3 6AQ5, 2 6080, 2 6J6, 2 1N23C, 2 1N86 or D979, 1 1N28A, 2 1N69, 1 1N198.

REFERENCE DATA AND LITERATURE:

Microwave, Field Intensity Meter, Model FIM, Preliminary Handbook of Instructions (Serial Nos. 131 and up).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

FIELD INTENSITY METER
MODEL FIM
(Polarad Electronics Corporation)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Monitor Unit Model FIM-B			17 - 13/16	23 - 1/2	21 - 1/2	70
1	Band 1 Tuning Unit Model FIM-L			17 - 3/8	16	14 - 1/2	50
1	Band 2 Tuning Unit Model FIM-S			17 - 3/8	16	14 - 1/2	50
1	Band 3 Tuning Unit Model FIM-M			17 - 3/8	16	14 - 1/2	50
1	Band 4 Tuning Unit Model FIM-X			17 - 3/8	16	14 - 1/2	50
1	Power Unit Model FIM-P			16 - 5/32	19 - 13/16	25 - 1/2	115
1	Omnidirectional Antenna Model CA-B			9 - 3/16	9 - 3/16	10 - 9/32	2.5
1	Band 1 Directive Antenna Model CA-L			9 - 7/16	13 - 3/4	8	2
1	Band 2 Directive Antenna Model CA-S			10 - 1/2	13- 29/32	17 - 11/16	3.5
1	Band 3 Feed Horn Model CA-M			2 - 1/4	1 - 15/16	3- 1/4	0.5
1	Band 4 Feed Horn Model CA-X			1 - 15/32	1- 5/8	3 - 1/8	0.5

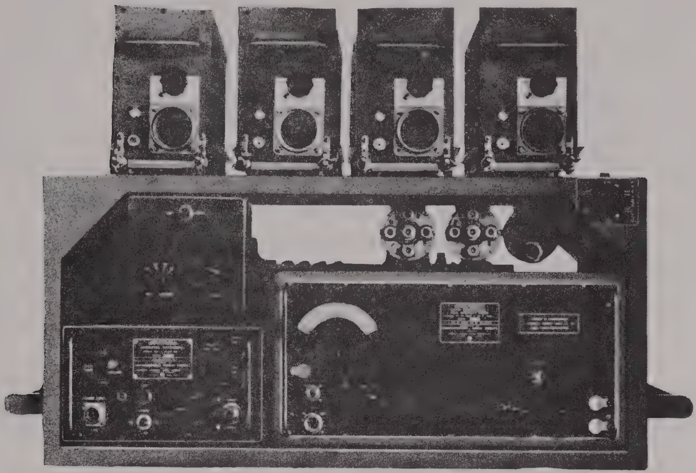
(Continued)

FIELD INTENSITY METER
MODEL FIM
(Polarad Electronics Corporation)

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Antenna Reflector, Model CA-R			19 - 15/16	20 - 13/16	13 - 3/16	2
1	Tripod Model CA-T			5	36 - 1/2	5	5
1	RF Cable			6 ft. long			1
1	Interconnecting Cable No. 1			8 ft. long			2.5
1	Interconnecting Cable No. 2			4 - 3/4 long			0.25
1	Interconnecting Cable No. 3			8 long			0.3
1	Power Cable			10 ft. long			1.5
1	Wrench Set						

RADIO FREQUENCY MEASURING SET
MODEL NM-60A
(Stoddart Aircraft Radio Company, Incorporated)



FUNCTIONAL DESCRIPTION:

A portable, general purpose radio interference measuring set used for detecting and measuring the intensity of radiated and conducted radio interference in the S, L, and X portions of the frequency spectrum. The instrument may also be used for field intensity measurements in the frequency range from 1000 megacycles per second to 10,700 megacycles per second.

RELATIONSHIP TO OTHER EQUIPMENT:

An AN/APR-9 RF tuner is required but not supplied. The Stoddart NM-60A is the modified commercial equivalent of the AN/URM-42.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit consists basically of a double superhetrodyne receiver incorporating an AN/APR-9 tuner. Test results are indicated by means of a calibrated meter located on the front panel. Three detector weighting circuit functions permit average, quasi-peak or peak analysis of the signal being

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5.1.3	

RADIO FREQUENCY MEASURING SET
MODEL NM-60A
(Stoddart Aircraft Radio Company, Incorporated)

ELECTROMECHANICAL DESCRIPTION (Continued)

measured. An impulse calibration method is employed to standardize the receiver gain for direct meter readings over the entire frequency range.

Power Supply: 105 to 125 volts, AC, 50 to 400 cycles per second, single-phase, 375 watts.

Frequency Range: 1000 to 10,700 megacycles per second in four bands.

Intermediate Frequencies: 160 and 60 megacycles per second.

Selectivity: 1.5 megacycles per second bandwidth at the 6 decibel points.

Image Rejection: 60 decibels or better.

Intermediate Frequency Rejection: 60 decibels or better.

Sensitivity as a Two Terminal Voltmeter: 5 to 15 microvolts.

Sensitivity as a Field Intensity Meter:

Broadband Conical Antenna With 6-Foot Cable: 48 to 68 decibels above 1.0 microvolt per meter; 44 to 64 decibels above 1.0 microvolt per meter per megacycle.

Directional Horn Antennas With 6-Foot RF Cable: 44 to 48 decibels above 1.0 microvolt per meter; 40 to 44 decibels above 1.0 microvolt per meter per megacycle.

Signal to Noise Ratio: Unity or better, based on stated sensitivity.

Audio Output: 100 milliwatts into 600 ohms, based on 1000 cycles per second, 30% modulation, and output indication of 10 microvolts.

Dynamic Range: 20 decibels.

MANUFACTURERS' OR CONTRACTORS' DATA:

Stoddart Aircraft Radio Company, Incorporated, 6644 Santa Monica Boulevard, Hollywood 38, California; Approximate Cost per Unit, $7,664.00; approved for use with Specifications MIL-I-11748B (Signal Corps), MIL-I-16910A (SHIPS), and MIL-I-26600 (U.S. Air Force).

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

RADIO FREQUENCY MEASURING SET
MODEL NM-60A
(Stoddart Aircraft Radio Company, Incorporated)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Meter, Radio-Interference-Field Intensity						
4	RF Tuners with Shock Trays and Power Plugs (Customer furnished)						
1	RF Tuner Power Supply						
1	RI-FI Meter Power Supply						
1	Power Supply 24 vdc						
1	Impulse Calibrator						
1	Control Panel						
1	Turrent Attenuator						
1	Junction Box						
3	Electrical Co-axial Switches						
1	Set Inter-connecting Cables						
1	Antenna (Small Discone) 1. 0-10. 7 kmc						
1	Antenna, Band 1 1. 0-2. 5 kmc						

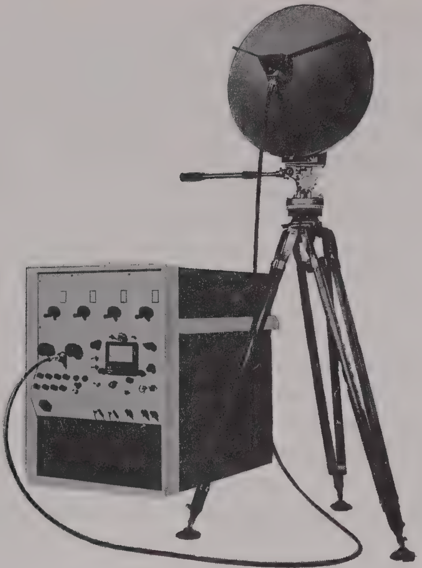
(Continued)

RADIO FREQUENCY MEASURING SET
MODEL NM-60A
(Stoddart Aircraft Radio Company, Incorporated)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Antenna, Band 2 2.5-4.4kmc						
1	Antenna, Band 3 4.4-7.0kmc						
1	Antenna, Band 4 7.0-10.7kmc						
1	Antenna Reflector						
1	Tripod						
1	Tripod Index Head						
1	Remote Meter						
1	Remote Meter Cable						
1	Headset Extension Cable						

RADIO INTERFERENCE MEASURING SET
MODEL NM-62A
(Stoddart Aircraft Radio Company, Incorporated)



FUNCTIONAL DESCRIPTION:

A general purpose microwave superheterodyne receiver designed for detecting and measuring radio frequency interference and making field intensity measurements. The equipment may also be used as a selective two-terminal voltmeter for conducted interference measurements. Quantitative frequency and field intensity measurements can be made in terms of average, quasi-peak, direct-reading peak, or slideback peak detector functions. A meter on the front panel has an approximately logarithmic 2 decade scale calibrated in microvolts and an approximately linear scale calibrated in decibels. Calibration charts are provided with the equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

Commercial equivalent to Radio Interference Measuring Set AN/URM-138.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The frequency range of the equipment is covered by means

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5.1.3	

RADIO INTERFERENCE MEASURING SET
MODEL NM-62A
(Stoddart Aircraft Radio Company, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)
of four intergral radio frequency tuners. A motor drive system is connected to the tuners and provides for automatic scanning over the frequency range of the equipment. An internal impulse generator is used as the reference standard to calibrate the gain of the equipment. An automatic frequency control circuit is provided to compensate for any long period frequency drift in the incoming signal. A turret attenuator provides for attenuation of received signals. Jacks and connectors on the front panel provide a stretched video output for connection to an oscilloscope, an intermediate frequency output for connection to a panadapter, a DC output for connection to a rectilinear plotter, and an audio output for connection of a headset. An internal speaker is also provided for monitoring the audio signal. An omnidirectional broadband discone antenna is provided to cover the entire frequency range of the equipment. The discone antenna is used primarily as a vertically polarized pickup device. A separate directive antenna is provided for each of the four radio frequency tuners. The antennas for bands 1 and 2 are of the horn type; the antennas for use with bands 3 and 4 are horn-fed parabolic assemblies. The antennas are equipped with mounting plates for attachment to a tripod. The power supply is transistorized.

Power Supply: 115 or 230 volts, AC, 50 to 60 cycles per second or 400 cycles per second, single-phase, 450 watts.

Frequency Range: 1 to 10 gigacycles (kilomegacycles) per second in four bands.

Narrow Band Sensitivity (Signal-to-Noise Ratio of Unity):

500 Kilocycle Per Second Bandwidth:

Two Terminal 50 Ohm Input: 2 to 4 microvolts, 6 to 12 decibels above 1 microvolt, -101 to -95 decibels referred to 1 milliwatt.

Horn Antennas: 20 to 40 microvolts per meter, 26 to 32 decibels above 1 microvolt per meter.

Discone Antenna: 80 to 640 microvolts per meter, 38 to 56 decibels above 1 microvolt per meter.

5 Megacycle Per Second Bandwidth:

Two Terminal 50 Ohm Input: 6 to 12 microvolts, 16 to 22 decibels above 1 microvolt, -91 to -85 decibels referred to 1 milliwatt.

Horn Antennas: 60 to 120 microvolts per meter, 36 to 43 decibels above 1 microvolt per meter.

Discone Antenna: 240 to 1920 microvolts per meter, 48 to 66 decibels above 1 microvolt per meter.

RADIO INTERFERENCE MEASURING SET
MODEL NM-62A
(Stoddart Aircraft Radio Company, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Broadband Sensitivity (Signal-to-Noise Ratio of Unity):

- 500 Kilocycle Per Second Bandwidth:
  - Two Terminal 50 Ohm Input: 13 to 26 microvolts per megacycle per second, 22 to 28 decibels above 1 microvolt per megacycle per second.
  - Horn Antennas: 130 to 260 microvolts per meter per megacycle per second, 42 to 48 decibels above 1 microvolt per meter per megacycle per second.
  - Discone Antenna: 520 to 4160 microvolts per meter per megacycle per second, 54 to 72 decibels above 1 microvolt per meter per megacycle.
- 5 Megacycle Per Second Bandwidth:
  - Two Terminal 50 Ohm Input: 4 to 8 microvolts per megacycle per second, 12 to 18 decibels above 1 microvolt per megacycle per second.
  - Horn Antennas: 40 to 80 microvolts per meter per megacycle per second, 32 to 38 decibels above 1 microvolt per meter per megacycle per second.
  - Discone Antenna: 160 to 1280 microvolts per meter per megacycle per second, 44 to 62 decibels above 1 microvolt per meter per megacycle per second.

Voltage Measurement Range: 120 decibels greater than rated sensitivity, 40 decibels in lowest attenuator position. Additional 80 decibels of attenuation in 20 decibel steps.

Input Impedance: 50 ohms with less than 1.5 to 1 voltage standing-wave ratio.

Intermediate Frequency Output: 60 megacycles per second, 10 millivolts across 50 ohms.

Video Output: Bandwidth 2.5 megacycles per second; Output impedance 300 ohms.

Analog Output:

- X Axis: 0 to 10 volts DC, voltage proportional to frequency.
- Y Axis: 3.3 volts DC across 100,000 ohm load at full scale meter deflection.

Internal Speaker Output: 1 watt, maximum.

Audio Output: 100 milliwatts into 600 ohms, maximum.

Impulse Generator Accuracy: ±1 decibel over entire frequency range.

Spurious Response Rejection: Image, 60 decibels minimum; all others, 80 decibels minimum.

Case Shielding Effectiveness: 90 decibels.

Local Oscillator Radiation: Less than 200 micromicrowatts.

Meter Range: 0 to 100 microvolts, 0 to 40 decibels.

Meter Overload Capacity: 20 decibels past full scale deflection.

Stretched Video Pulse Width: 0, 30, 160 or 800 microseconds.

RADIO INTERFERENCE MEASURING SET
MODEL NM-62A
(Stoddart Aircraft Radio Company, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Horn, Band 1:
- Frequency Range: 1 to 2.3 gigacycles per second.
- Power Gain: 8 decibels at 1 gigacycle, 16 decibels at 2.3 gigacycles per second.
- Antenna Factor: 20.5 decibels at 1 gigacycle per second, 22 decibels at 2.3 gigacycles per second.

Horn, Band 2:
- Frequency Range: 2.3 to 4.4 gigacycles per second.
- Power Gain: 16 decibels at 2.2 gigacycles per second, 22 decibels at 4.4 gigacycles per second.
- Antenna Factor: 20 decibels at 2.3 gigacycles per second, 21 decibels at 4.4 gigacycles per second.

Horn with Reflector, Band 3:
- Frequency Range: 4.4 to 7.3 gigacycles per second.
- Power Gain: 23 decibels at 4.3 gigacycles per second, 28 decibels at 7.3 gigacycles per second.
- Antenna Factor: 18 decibels at 4.3 and 7.3 gigacycles per second.

Horn with Reflector, Band 4:
- Frequency Range: 7.3 to 10 gigacycles per second.
- Power Gain: 28 decibels at 7.3 gigacycles per second, 31 decibels at 10 gigacycles per second.
- Antenna Factor: 18.5 decibels at 7.3 and at 10 gigacycles per second.

Reflector Characteristics: 18 inch solid parabola with 7 inch focal length.
VSWR of Horn and Discone Antennas: Less than 2 to 1.

MANUFACTURERS' OR CONTRACTORS' DATA:

Stoddart Aircraft Radio Company, Incorporated, 6644 Santa Monica Boulevard, Hollywood 38, California; Approximate Cost per Unit, $18,000.00.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Brochure.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Radio Interference Measuring Set, Stoddart NM-62A					

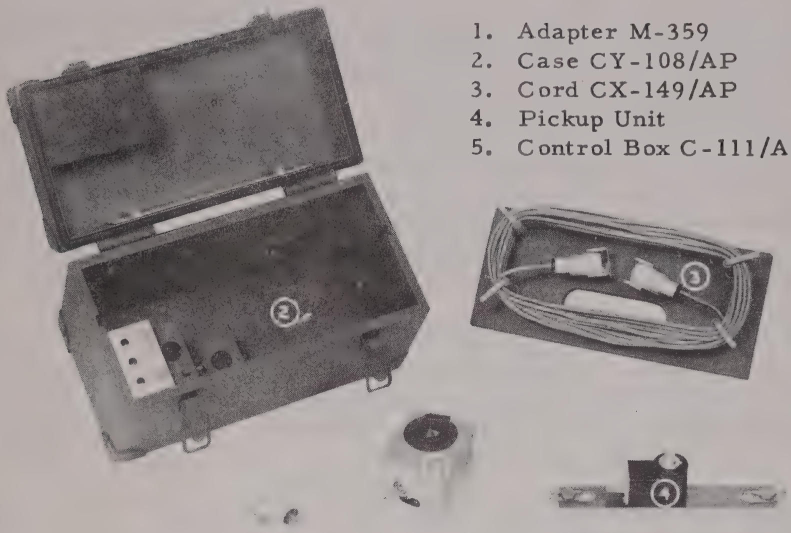
RADIO INTERFERENCE MEASURING SET
MODEL NM-62A
(Stoddart Aircraft Radio Company, Incorporated)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radio Interference Measuring Set NM-62A	Metal		28	24	22	280
1	Horn Antenna Stoddart 91888-1			13-3/8	9-1/8	19-3/8	
1	Horn Antenna Stoddart 91889-1			13-9/16	10-1/4	23-5/8	
1	Horn Antenna Stoddart 91890-1						
1	Horn Antenna Stoddart 91891-1						
1	Antenna Mounting Base Stoddart 92341-1						
1	Antenna Reflector, Stoddart 91892-1			19-1/4	18-5/8	13-1/4	
1	Discone Antenna, Stoddart 90794-2						
1	Antenna Tripod Stoddart 92245-1						
1	RF Cable Stoddart 92477-1			72 long			
1	AC Power Cable, Stoddart 92342-1			72 long			

5.2 ANTENNA PATTERN MEASURING EQUIPMENT

PICKUP ASSEMBLY TS-131/AP
(METER, FIELD STRENGTH, TS-131/AP)



1. Adapter M-359
2. Case CY-108/AP
3. Cord CX-149/AP
4. Pickup Unit
5. Control Box C-111/AP

FUNCTIONAL DESCRIPTION:

A special purpose test antenna assembly used to indicate the relative output of a transmitting antenna installed on an airplane. The equipment is not designed for permanent installation and is used for test purposes only on Transmitting Equipment such as AN/APT-1, Radar Set AN/APT-2, etc.

RELATIONSHIP TO OTHER EQUIPMENT:

TS-131A/AP is an improved model.

Equipment required but not supplied: Test Set I-139-A (0-1 milliampere, DC, milliammeter with cord and plug). Since some transmitter adjustments also require the use of I-139-A, it is advantageous to use two I-139-A.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The short antenna rod which is included in the Pickup Assembly TS-131/AP is mounted near the transmitting antenna on the exterior of the

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-526237		3F4325-131
PROCUREM'T INFO.:	USAF Spec. No. 71-5051		
PROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, ARL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	5.2
	- Electronics Test Equipment -		TS-131/AP

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

PICKUP ASSEMBLY TS-131/AP
(METER, FIELD STRENGTH, TS-131/AP)

ELECTROMECHANICAL DESCRIPTION: (Continued)

aircraft for testing purposes. This antenna picks up a small portion of the radiation. The signal is rectified by a crystal connected between the antenna rod and ground and is then fed through a radio frequency choke into a shielded cable. The radio frequency choke is provided to prevent the cable capacity from short circuiting the crystal at high frequencies.

After passing through the shielded cable, the rectified signal is fed to a rheostat which is in series with DC milliammeter (Test Set I-139-A). The rheostat provides control over the current through the I-139-A so that the equipment may be used over a wide range of input signal strengths.

Power Supply: No power source is required for operation of the pickup assembly.

Frequency Range: 20 to 1000 megacycles per second approximately.

MANUFACTURERS' OR CONTRACTORS' DATA:

Cover Dual Company, 5215 Ravenwood Avenue, Chicago, Illinois; Order No. 659-DAY-44; Approximate Cost per Unit, $49.13, Order No. 649-44, 22 February 1944; Approximate Cost per Unit, $23.31, Order No. 985-44, 18 September 1944; Approximate Cost per Unit, $20.95.

TUBE COMPLEMENT:

1 JAN-1N21B (Crystal Rectifier)

REFERENCE DATA AND LITERATURE:

TO 16-35TS131-2 (Maintenance Instructions).

TO 16-55-80 (Spare Parts List).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Pickup Assembly, TS-131/AP, with accessories. (Shelf package - water resistant carton)	.50	12	8	9	9.5

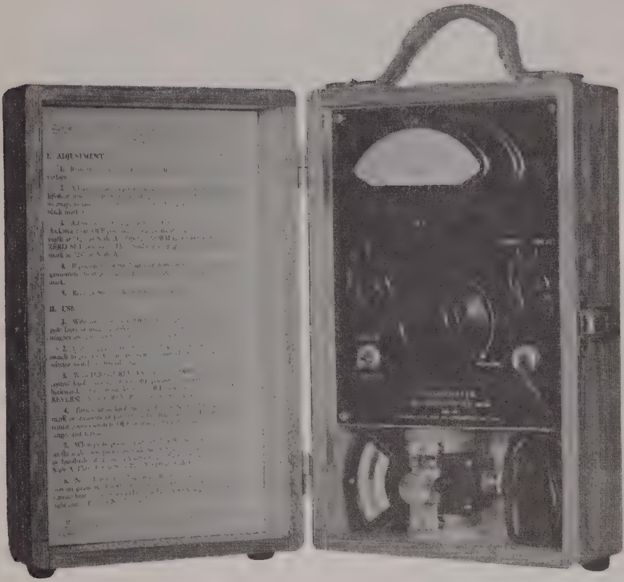
PICKUP ASSEMBLY TS-131/AP
(METER, FIELD STRENGTH, TS-131/AP)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Pickup Assembly TS-131/AP less accessories		7CAC-526237 3F4325-131	6-1/2	1	4	0.3
1	Control Box C-111/AP		1690-325938400 3F1795-111	1-31/32	2-11/32	1-27/32	0.4
1	Cord CX-149/AP		1690-322849979 3E6000-149	420 long			0.8
1	Adapter M-359		8850-107500 2Z299-359				0.1
1	Case CY-108/AP	Wood	1690-326125585 3F2529-108	9-7/8	5-11/16	6-5/16	
4	Snap Slide Stud		1690-295757257 2Z8634-3				
3	Spare Crystal 1N21B		3300-234137010 2J1N21B				
						Total:	1.6

5. 3 MAGNETIC FIELD MEASURING EQUIPMENT

FLUXMETER TS-15/AP



FUNCTIONAL DESCRIPTION:

A portable meter used to provide qualitative measurements of the flux densities between the pole faces of magnets employed in oscillatory circuits of x-band and s-band transmitters. The meter is calibrated directly in Gauss units of flux density. All controls and indicators are located on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to TS-15A/AP and TS-15B/AP except for certain modifications made in the later models to facilitate operation and insure greater accuracy of measurements, and for additional equipment supplied with TS-15A/AP and TS-15B/AP.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of two milliammeters in series, a group meter, and a probe meter, a rheostat and associated shunts. When taking measurements,

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-312150	SNSNF-17-M-23912-2401	3F4325-15
PROCUREM'T INFO.:	USAF Spec. No. 7425		
PROCUREM'T COG.:	Army	DESIGN COG.:	Army, ESL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	5.3
	- Electronics Test Equipment -		TS-15/AP

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

FLUXMETER TS-15/AP

ELECTROMECHANICAL DESCRIPTION: (Continued)

the probe meter is inserted between the poles of the magnet under test and the indications are read on the Gauss meter. The probe meter uses the field of the magnet under test to produce a deflection when a current is passed through its coil. The indication on the probe meter is always adjusted to the same point by varying the current. The current required to produce this reading is then a measure of flux density.

Power Supply: 1.5 volts supplied by 1 Battery, BA-30 (1.5 volts).

Flux Density Range: 1200 to 2300 Gauss "A" scale.
1700 to 3200 Gauss "B" scale.
2400 to 4500 Gauss "C" scale.

Accuracy: ±2% between limits of 1200 to 1700 Gauss on "A" scale, 1700 to 2400 Gauss on "B" scale, and 2400 to 3000 on "C" scale.

MANUFACTURERS' OR CONTRACTORS' DATA:

Marion Electrical Instrument Company, 407 Canal Street, Manchester, New Hampshire; Approximate Cost per Unit, $150.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TM 11-1088 (Instruction Book).
TM 11-2559 (Instruction Book).
TO 16-35TS15-3 (Maintenance Instructions).
TO 16-35TS15-5
TO 16-35TS15-6

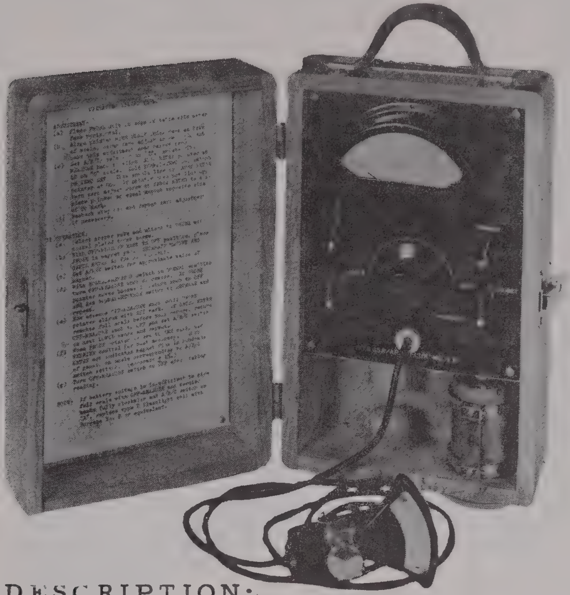
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Fluxmeter, TS-15/AP (Shelf Package, Water Resistant Carton)	0.47	13	9	7	9

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Fluxmeter TS-15/AP Including:	Wood	7CAC-312150 F-17-M-23912-2401 3F4325-15	10	6	4-1/2	6.5
1	Yoke Assembly		1690-328572000 3F53400	1-13/16	1-1/2	2-3/16	

FLUXMETER TS-15A/AP



FUNCTIONAL DESCRIPTION:

A portable meter used to provide qualitative measurements of the flux densities between the pole faces of magnets employed in oscillatory circuits of x-band and s-band transmitters. The meter is calibrated directly in Gauss units of flux density. All controls and indicators are located on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to TS-15B/AP except that TS-15B/AP is not supplied with handle for holding probe and an additional yoke.

TS-15A/AP and TS-15B/AP are similar to TS-15/AP except for certain modifications made to facilitate operation and insure greater accuracy of measurements.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of two milliammeters in series, a group meter, and a probe meter, a rheostat and associated shunts. When taking measurements, the probe meter is inserted between the poles of the magnet under test and the indications are read on the Gauss meter. The probe meter uses the field of the magnet under test to produce a deflection when a current is passed through its coil. The indication on the probe meter is always adjusted to the same point by

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-312140	ASO R16-T-AN-TS-15A/AP	3F4325-15A
PROCUREM'T INFO.:			
PROCUREM'T COG.: Army		DESIGN COG.: Army, ESL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5.3	
	- Electronics Test Equipment -		TS-15A/AP

s project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

FLUXMETER TS-15A/AP

ELECTROMECHANICAL DESCRIPTION: (Continued)

varying the current. The current required to produce this reading is then a measure of flux density.

Power Supply: 1.5 volts supplied by 1 Battery, BA-30 (1.5 volts).

Flux Density Range: 1200 to 2400 Gauss.
2400 to 4800 Gauss.
4800 to 9600 Gauss.

Gap Size: 0.6" - 0.7"
1.3" - 1.5"

Pole Face Diameter: 0.67" - 1.12"
1.5" - 2.0"

Accuracy: ±2%.

MANUFACTURERS' OR CONTRACTORS' DATA:

Marion Electrical instrument Company, 407 Canal Street, Manchester, New Hampshire, Navy Contract No. NXss-21899; Approximate Cost per Unit, $150.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TM 11-1088 (Instruction Book).
TM 11-2559 (Instruction Book).
TO 16-35TS15-3 (Maintenance Instructions).
TO 16-35TS15-5
TO 16-35TS15-6
TO 16-55-454 (Spare Parts List).

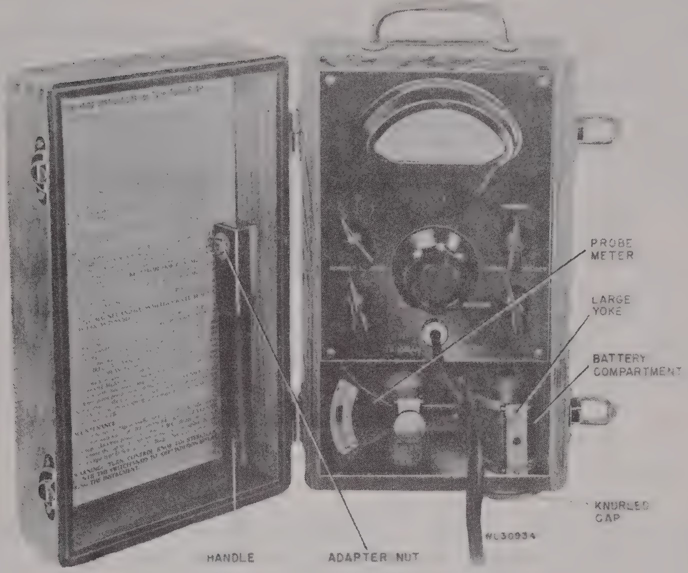
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Fluxmeter, TS-15A/AP (Shelf Package, Water Resistant Carton)	0.47	13	9	7	9

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Fluxmeter TS-15A/AP	Wood	7CAC-312140 R16-T-AN-TS-15A/AP 3F4325-15A	10	6	4-1/2	6.5
1	Yoke Assembly		1690-328572001 3F53400.1	1-11/16	1	1-1/16	
1	Yoke Assembly		1690-328572000 3F53400	2-3/16	1-1/2	1-13/16	

FLUXMETER TS-15B/AP



FUNCTIONAL DESCRIPTION:

A portable meter used to provide qualitative measurements of the flux densities between the pole faces of magnets employed in oscillatory circuits of x-band and s-band transmitters. The meter is calibrated directly in Gauss units of flux density. All controls and indicators are located on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Fluxmeter TS-15A/AP except as follows: Supplied with handle for holding probe, and an additional yoke.

TS-15A/AP and TS-15B/AP are similar to TS-15/AP except for certain modifications made to facilitate operation and insure greater accuracy of measurements.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of two milliammeters in series, a Gauss meter, and

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-312130	F17-M-23912-2401	3F4325-15B
PROCUREM'T INFO.:			
PROCUREM'T COG.: Army		DESIGN COG.: Army, ESL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5. 3	
	- Electronics Test Equipment -		TS-15B/AP

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

FLUXMETER TS-15B/AP

ELECTROMECHANICAL DESCRIPTION: (Continued)

a probe meter, a rheostat and associated shunts. When taking measurements, the probe meter is inserted between the poles of the magnet under test and the indications are read on the Gauss meter. The probe meter uses the field of the magnet under test to produce a deflection when a current is passed through its coil. The indication on the probe meter is always adjusted to the same point by varying the current. The current required to produce this reading is then a measure of flux density.

Power Supply: 1.5 volts supplied by 1 Battery BA-30.

Flux Density Range: 1200 to 2400 Gauss
2400 to 4800 Gauss
4800 to 9600 Gauss.

Gap Size: 0.5" - 0.75"
1.30" - 1.51"
2.0" - (B model)

Pole Face Diameter: 0.75"
1.625"
2.0" (B model)

Accuracy: ±2%.

MANUFACTURERS' OR CONTRACTORS' DATA:

Marion Electrical Instrument Company, 407 Canal Street, Manchester, New Hampshire; Approximate Cost per Unit, $150.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TM 11-1088 (Instruction Book).
TM 11-2559 (Instruction Book).
TO 16-35TS15-3 (Maintenance Instructions).
TO 16-35TS15-5
TO 16-35TS15-6
TO 16-55-454 (Spare Parts List).

SHIPPING DATA:

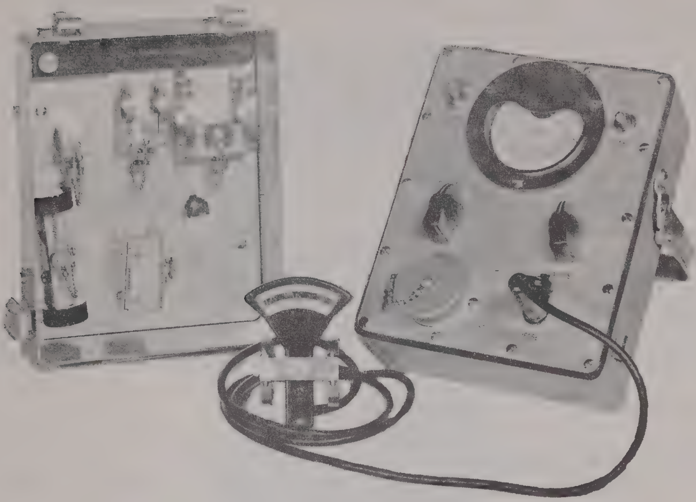
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	**Fluxmeter, TS-15B/AP (Shelf Package, Water Resistant Carton)**	0.47	13	9	7	9

FLUXMETER TS-15B/AP

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	**Fluxmeter TS-15B/AP Including:**	**Wood**	7CAC-312130 F17-M-23912-2401 3F4325-15B	10	6	4-1/2	
1	**Yoke Assembly**		1690-328572001 3F53400.1	1-1/16	1-11/16	1	
1	**Yoke Assembly**		1690-328572000 3F53400	1-13/16	1-1/2	2-3/16	
1	**Handle**		3F4890-1	5-3/4	3/4		
1	**Adapter Nut**		1690-286054116 2Z306-17	5/8	3/8		
						Total:	6-1/2

FLUXMETER TS-15C/AP



FUNCTIONAL DESCRIPTION:

A portable meter used to provide qualitative measurements of the flux densities between the pole faces of magnets employed in oscillatory circuits of x-band and s-band transmitters. The meter is calibrated directly in gauss units of flux density. All controls and indicators are located on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Fluxmeter TS-15B/AP except as follows: External dimensions and weight altered; metal case instead of wood case; four probe meter adapters instead of two.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The circuit consists of two milliammeters in series, a gauss meter, a probe meter, a rheostat, and associated shunts. When taking measurements, the probe meter is inserted between the poles of the magnet under test and the indications are read on the gauss meter. The probe meter uses the field of the magnet under test to produce a deflection when a current is passed through its coil. The indication of the probe meter is always adjusted to the same point by varying the current. The current required to produce this reading is then a

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-312175		
PROCUREM'T INFO.: Spec. Mil-F-11543			
PROCUREM'T COG.: USA		DESIGN COG.: USA, SCEL, ESL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5.3	
- Electronics Test Equipment -			TS-15C/AP

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

FLUXMETER TS-15C/AP

ELECTROMECHANICAL DESCRIPTION: (Continued)

measure of flux density.

Power Supply: 1.5 volts supplied by 1 Battery BA-30.

Flux Density Range: 1200 to 2400 gausses.
2400 to 4800 gausses.
4800 to 9600 gausses.

Gap Size: 0.6 inch to 4.44 inches (using probe meter adapters).
4.44 inches and wider (using probe meter handle).

Pole Face Diameter: 0.87 inch to 2 inches.

Accuracy: ±2%.

MANUFACTURERS' OR CONTRACTORS' DATA:

T.L.G. Electric Corporation, 31 West 27th Street, New York 1, New York; Order No. 3364-Phila-52, 9 March 1954; Approximate Cost per Unit, $250.00.

TUBE COMPLEMENT: None.

REFERENCE DATA AND LITERATURE:

T.L.G. Electric Corporation, "Instruction Book for Fluxmeter TS-15C/AP."

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Fluxmeter TS-15C/AP (including adapters and probe meter)	1/2	8-1/2	10-1/2	9	9-1/2

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Fluxmeter TS-15C/AP	Aluminum	7CAC-312175	6	8-1/2	6-1/2	6
1	Adapter	Polyethelene			4-7/16	1-1/8 dia.	
1	Adapter	Brass		2	1-7/8	1-1/2	
1	Adapter	Brass		1-11/16	1-3/32	1	
1	Adapter	Brass		2	1-13/16	1-1/2	
1	Handle	Aluminum			5-1/4	3/4	
1	Probe Meter	Bakelite		1-5/8	2-5/8	1-3/4	

GAUSSMETER
MODEL D-79
(Dyna-Labs, Incorporated)

FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument used to measure the magnitude and direction of flux density. The unit may also be used to determine flux paths and to locate leakage fields. Test results are indicated on a calibrated meter located on the front panel of the equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The meter operates on the principle of the "Hall effect" (the development of a transverse, electric potential-gradient in a current carrying conductor). A non-magnetic probe is used as the current carrying conductor and constitutes one arm of a bridge circuit. When the probe is inserted in a magnetic field, the bridge becomes unbalanced in proportion to the strength of the magnetic field. A highly sensitive probe is provided for measurement of low density fields and a linear probe is provided for measurement of high density

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Substitute Standard	
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 5.3	

GAUSSMETER
MODEL D-79
(Dyna-Labs, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

fields. The probes are constructed of a noncorrosive, rust proof material. When performing measurements above the normal ambient temperature and humidity range, the instrument should be compared to a standard magnetic field and readjusted for a true meter reading.

Power Supply: 105 to 125 volts, AC, 50 to 60 cycles per second, single-phase, 75 watts.

Meter Range: 10 to 30,000 gauss AC (rms) or DC in four ranges.

Frequency Response: Flat to 400 cycles per second; comparative readings to 1000 cycles per second.

Meter Accuracy: ±2.5% over the entire range.

Calibrated Magnetic Air Gap Accuracy: ±1% of value indicated.

MANUFACTURERS' OR CONTRACTORS' DATA:

Dyna-Labs, Incorporated, 1075 Stewart Avenue, Garden City, Long Island, New York; Approximate Cost per Unit, $350.00.

TUBE COMPLEMENT:

1 6X4, 1 6AL5, 1 12AU7, 4 6AU6.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

EQUIPMENT SUPPLIED:

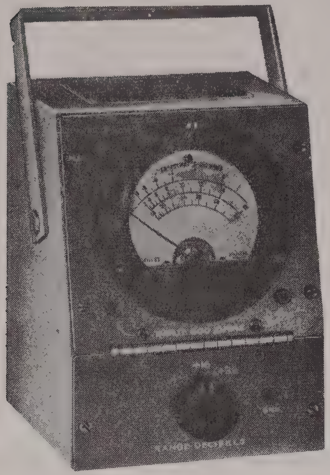
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Gaussmeter Dyna-Labs D-79	Metal		13	6 - 3/4	10 - 1/2	10.5
2	Probes			.025	.200	1 - 3/4	
1	Cable			48 long			

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Gaussmeter Dyna-Labs D-79					

5.5 SOUND LEVEL MEASURING EQUIPMENT

AUDIO LEVEL METER AN/URM-38



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used to measure the intensity of audio signals. Test results are indicated by a hermetically sealed meter calibrated in decibels.

RELATIONSHIP TO OTHER EQUIPMENT:

The AN/URM-38 is the overall nomenclature for Audio Level Meter ME-49/U. The AN/URM-38 is similar to Audio Level Meter Hickok 900-079.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The instrument is a nonelectronic device which utilizes a copper oxide rectifier to convert the input audio signals to DC for energizing the meter movement.

Power Supply: None.

Frequency Range: 60 to 10,000 cycles per second,

Decibel Range: -20 to +2 decibels; +2 to +16 decibels; +16 to +30 decibels.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.		F16-Q-123752-0100	
PROCUREM'T INFO.: Spec MIL-M-131			
PROCUREM'T COG.:		DESIGN COG.: Navy	
F.I.I.N.: 6625-352-0019		FUNCTIONAL CLASS. NO.: 5.5	
	- Electronics Test Equipment -		AN/URM-38

AUDIO LEVEL METER AN/URM-38

ELECTROMECHANICAL DESCRIPTION: (Continued)

Meter Movement: 217 microamps for full scale deflection.
Meter Accuracy: ±2% of full scale.
Input Impedance: 600 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hickock Electrical Instrument Company, 10514 Dupont Avenue, Cleveland, Ohio; Contract No. NObsr-49136.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

NavShips 91470.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Audio Level Meter AN/URM-38	Aluminum	F16-Q-123752-0100	3-5/8	5-1/2	7-5/32	
	Including:						
1	Audio Level Meter ME-49/U						
1	Transit Case			6-3/8	8-1/2	4-3/8	
2	Test Lead			48 long			

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

ELECTRICAL & ELECTRONIC

TEST EQUIPMENT DATA HANDBOOK

VOLUME 6

IMPEDANCE AND STANDING WAVE RATIO MEASURING EQUIPMENT

⑥

FREDERICK RESEARCH CORPORATION
2601 UNIVERSITY BOULEVARD, WEST
WHEATON, MARYLAND

/131

ELECTRICAL & ELECTRONIC

TEST EQUIPMENT DATA HANDBOOK

VOLUME 6

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FREDERICK RESEARCH CORPORATION
2601 UNIVERSITY BOULEVARD, WEST
WHEATON, MARYLAND

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION

6. IMPEDANCE AND STANDING-WAVE RATIO MEASURING EQUIPMENT

- 6. 1 Impedance and Related Measuring Equipment
  - 6. 1. 1 Resistance Measuring Equipment
  - 6. 1. 2 Inductance Measuring Equipment
  - 6. 1. 3 Capacitance Measuring Equipment
  - 6. 1. 4 Combination R-C-L Measuring Equipment
  - 6. 1. 5 Impedance Measuring Equipment
  - 6. 1. 6 Admittance Measuring Equipment
  - 6. 1. 7 Combination Impedance and Admittance Measuring Equipment
  - 6. 1. 8 Power Factor or Phase Measuring Equipment
  - 6. 1. 9 "Q" and/or Dissipation Measuring Equipment
- 6. 2 Standing-Wave Measuring Equipment
  - 6. 2. 1 Slotted Line SWR Measuring Equipment
  - 6. 2. 2 Directional Coupler or Reflectometer SWR Measuring Equipment
- 6. 3 Wire and Cable Testing Equipment

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION - DEFINITIONS

6. IMPEDANCE AND STANDING-WAVE RATIO MEASURING EQUIPMENT

Equipment used to measure either the impedance of passive two-terminal networks or electrical standing-wave ratios existing in any system.

6.1 IMPEDANCE AND RELATED MEASURING EQUIPMENT

An equipment used to measure electrical resistance, inductance, capacitance, or impedance, or related parameters.

6.1.1 RESISTANCE MEASURING EQUIPMENT

An instrument used to measure electrical resistance.

6.1.2 INDUCTANCE MEASURING EQUIPMENT

An instrument used to measure electrical inductance.

6.1.3 CAPACITANCE MEASURING EQUIPMENT

An instrument used to measure capacitance.

6.1.4 COMBINATION R-C-L MEASURING EQUIPMENT

A single instrument used to measure resistance, capacitance, inductance.

6.1.5 IMPEDANCE MEASURING EQUIPMENT

An instrument used to measure a complex impedance.

6.1.6 ADMITTANCE MEASURING EQUIPMENT

An instrument used to measure the reciprocal of an impedance.

6.1.7 COMBINATION IMPEDANCE AND ADMITTANCE MEASURING EQUIPMENT

A single equipment capable of measuring a complex impedance or its reciprocal.

6.1.8 POWER FACTOR OR PHASE MEASURING EQUIPMENT

An instrument used to measure power factor or the relative phase of two signals.

6.1.9 "Q" AND/OR DISSIPATION MEASURING EQUIPMENT

An instrument used to measure the ratio of reactance to effective resistance (Q) and/or its reciprocal (Dissipation Factor).

6.2 STANDING-WAVE MEASURING EQUIPMENT

An equipment used to indicate or measure electrical standing waves and/or reflection coefficients in any system.

6.2.1 SLOTTED LINE SWR MEASURING EQUIPMENT

A device used to measure standing and/or reflected waves, by employing a slotted line and detecting probe.

6.2.2 DIRECTIONAL COUPLER OR REFLECTOMETER SWR MEASURING EQUIPMENT

A device used to measure standing and/or reflected waves employing a directional coupler.

6.3 WIRE AND CABLE TESTING EQUIPMENT

An equipment of the impedance measuring type used to examine wire and cable characterists and phyiscal properties by means of impedance measurements.

TABLE OF CONTENTS

6. IMPEDANCE AND STANDING-WAVE RATIO MEASURING EQUIPMENT

6. 1 IMPEDANCE AND RELATED MEASURING EQUIPMENT

Functional Classification	Designation	Name	
6. 1	Sperry 1,000,178	Checker, Continuity, Polar NAV Control	147
6. 1. 1	AN/GPM-11	Indicator Test Set	149
6. 1. 1	AN/PSM-1A	Insulation Test Set	153
6. 1. 1	AN/PSM-2A	Insulation Test Set	155
6. 1. 1	AN/USM-18	Resistance Bridge Test Set	157
6. 1. 1	AN/USM-21	Ohmmeter	159
6. 1. 1	AN/USM-51	Megger Ground Tester	161
6. 1. 1	AN/USM-52	Insulation and Resistance Tester	163
6. 1. 1	I-48-B	Test Set	165
6. 1. 1	I-49	Test Set	167
6. 1. 1	I-49-B	Test Set	169
6. 1. 1	TS-269A/UR	Test Set	173
6. 1. 1	TS-269B/UR	Test Set	177
6. 1. 1	TS-387/U	Test Set	181
6. 1. 1	ZM-4/U	Resistance Bridge	185
6. 1. 1	ZM-4B/U	Resistance Bridge	187
6. 1. 1	ZM-9/U	Resistance Bridge	189
6. 1. 1	ZM-17/U	Ohmmeter	193
6. 1. 1	ZM-21A/U	Ohmmeter	195
6. 1. 1	ZM-23/U	Megohmmeter	197
6. 1. 1	60089	Vacuum Tube Megohmmeter	199
6. 1. 1	AC Spark Plug MTL-41401	K-System Cable Tester	201

TABLE OF CONTENTS (Continued)

Functional Classification	Designation	Name
6.1.1	Biddle 7679-RK	Megger Insulation Tester 205
6.1.1	Biddle 9679-RK	Megger Insulation Tester 207
6.1.1	Leeds and Northrup 4725	DC Wheatstone Bridge 211
6.1.1	Shallcross 671	Milliohmmeter 213
6.1.3	General Radio 740B	Capacitance Test Bridge 215
6.1.3	Minneapolis-Honeywell HT 108	Tester, Fuel Gage Tank Unit 217
6.1.4	TS-460C/U	Impedance Bridge 219
6.1.4	ZM-3/U	Analyzer 223
6.1.4	ZM-6/U	Impedance Bridge 227
6.1.4	ZM-11/U	Capacitance-Inductance-Resistance Bridge 229
6.1.5	AN/URM-39	Impedance Bridge 231
6.1.5	TS-582/U	Impedance Bridge 235
6.1.5	60094	RF Bridge 239
6.1.5	Electro-Measurements 250DA	Impedance Bridge 243
6.1.6	General Radio 1602-B	Admittance Meter 245
6.1.8	ME-63/U	Phase Monitor 249
6.1.8	AD-YU 205A1	Phase Detector 251
6.1.8	Electrical Facilities K-3	Phase Sequence Indicator 255
6.1.8	Maxson P-1060	Low Frequency Phase Met 257
6.1.8	North Atlantic VM-204-s151	Phase Angle Voltmeter 259
6.1.9	TS-617/U	Q Meter 261
6.1.9	ZM-22/U	Q Meter 265

TABLE OF CONTENTS (Continued)

Functional Classification	Designation	Name	
6.1.9	Boonton 170-A	Q Meter	267

6.2 STANDING-WAVE MEASURING EQUIPMENT

Functional Classification	Designation	Name	
6.2	I-148-A	Test Set	271
6.2.1	AN/UPM-24	Radar Test Set	273
6.2.1	AN/USM-6	Impedance Measuring Test Set	275
6.2.1	AN/USM-7	Impedance Measuring Test Set	279
6.2.1	AN/USM-11	Impedance Measuring Test Set	283
6.2.1	AN/USM-14	Impedance Measuring Test Set	287
6.2.1	AN/USM-37	Standing-Wave Indicator	291
6.2.1	IM-23/U	Slotted Line	295
6.2.1	IM-23A/U	Slotted Line	299
6.2.1	IM-28/U	Slotted Line	301
6.2.1	IM-81/UP	Standing-Wave Indicator	305
6.2.1	IM-92/U	Slotted Line	307
6.2.1	TS-12/AP	Standing-Wave Indicator	311
6.2.1	TS-130/UP	Standing-Wave Meter	315
6.2.1	TS-130A/UP	Standing-Wave Meter	317
6.2.1	Sperry 320	Meter, Impedance	321
6.2.2	AN/UPM-108	Standing-Wave Indicator	323
6.2.2	TS-204/AP	Reflectometer	327
6.2.2	TS-377/U	Reflectometer	331
6.2.2	Jones MM706	Reflectometer	335
6.2.2	Jones MM707	Reflectometer	337

TABLE OF CONTENTS (Continued)

Functional Classification	Designation	Name	
6.3	WIRE AND CABLE TESTING EQUIPMENT:		
6.3	AN/UPM-16	Electrical Cable Test Set	341
6.3	AN/USM-88	Test Set, Electrical Cabl	345
6.3	Ideal Industries 36/41-001B	Tester, Insulation Breakdown	349
6.3	Industrial Instruments, P-2	Voltage Breakdown Tester	351
6.3	Radio Frequency Labs 1203	Insulation Tester	355

ALPHA-NUMERICAL INDEX

Designation	Name	Functional Classification
AN/GPM-11	Indicator Test Set	6.1.1
AN/PSM-1A	Insulation Test Set	6.1.1
AN/PSM-2A	Insulation Test Set	6.1.1
AN/UPM-16	Electrical Cable Test Set	6.3
AN/UPM-24	Radar Test Set	6.2.1
AN/UPM-108	Standing-Wave Indicator	6.2.2
AN/URM-39	Impedance Bridge	6.1.5
AN/USM-6	Impedance Measuring Test Set	6.2.1
AN/USM-7	Impedance Measuring Test Set	6.2.1
AN/USM-11	Impedance Measuring Test Set	6.2.1
AN/USM-14	Impedance Measuring Test Set	6.2.1
AN/USM-18	Resistance Bridge Test Set	6.1.1
AN/USM-21	Ohmmeter	6.1.1
AN/USM-37	Standing-Wave Indicator	6.2.1
AN/USM-51	Megger Ground Tester	6.1.1
AN/USM-52	Insulation and Resistance Tester	6.1.1
AN/USM-88	Test Set, Electrical Cable	6.3
I-48-B	Test Set	6.1.1
I-49	Test Set	6.1.1
I-49-B	Test Set	6.1.1
I-148-A	Test Set	6.2
IM-23/U	Slotted Line	6.2.1
IM-23A/U	Slotted Line	6.2.1
IM-28/U	Slotted Line	6.2.1
IM-81/UP	Standing-Wave Indicator	6.2.1
IM-92/U	Slotted Line	6.2.1

ALPHA-NUMERICAL INDEX (Continued)

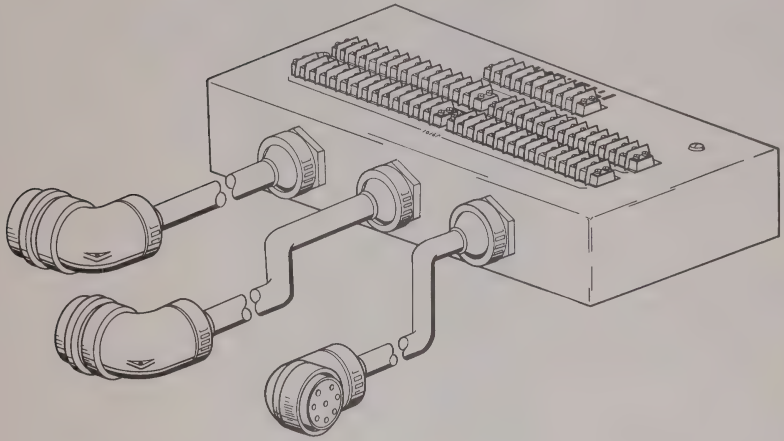
Designation	Name	Functional Classificatio
ME-63/U	Phase Monitor	6.1.8
TS-12/AP	Standing-Wave Indicator	6.2.1
TS-130/UP	Standing-Wave Meter	6.2.1
TS-130A/UP	Standing-Wave Meter	6.2.1
TS-204/AP	Reflectometer	6.2.2
TS-269A/UR	Test Set	6.1.1
TS-269B/UR	Test Set	6.1.1
TS-377/U	Reflectometer	6.2.2
TS-387/U	Test Set	6.1.1
TS-460C/U	Impedance Bridge	6.1.4
TS-582/U	Impedance Bridge	6.1.5
TS-617/U	Q Meter	6.1.9
ZM-3/U	Analyzer	6.1.4
ZM-4/U	Resistance Bridge	6.1.1
ZM-4B/U	Resistance Bridge	6.1.1
ZM-6/U	Impedance Bridge	6.1.4
ZM-9/U	Resistance Bridge	6.1.1
ZM-11/U	Capacitance-Inductance-Resistance Bridge	6.1.4
ZM-17/U	Ohmmeter	6.1.1
ZM-21A/U	Ohmmeter	6.1.1
ZM-22/U	Q Meter	6.1.9
ZM-23/U	Megohmmeter	6.1.1
60089	Vacuum Tube Megohmmeter	6.1.1
60094	RF Bridge	6.1.5
AC Spark Plug MTL-41401	K-System Cable Tester	6.1.1

ALPHA-NUMERICAL INDEX (Continued)

Designation	Name	Functional Classification
AD-YU 205A1	Phase Detector	6. 1. 8
Biddle 7679-RK	Megger Insulation Tester	6. 1. 1
Biddle 9679-RK	Megger Insulation Tester	6. 1. 1
Boonton 170-A	Q Meter	6. 1. 9
Electrical Facilities K-3	Phase Sequence Indicator	6. 1. 8
Electro-Measurements 250DA	Impedance Bridge	6. 1. 5
General Radio 740B	Capacitance Test Bridge	6. 1. 3
General Radio 1602-B	Admittance Meter	6. 1. 6
Ideal Industries 36/41-001B	Tester, Insulation Breakdown	6. 3
Industrial Instruments P-2	Voltage Breakdown Tester	6. 3
Jones MM706	Reflectometer	6. 2. 2
Jones MM707	Reflectometer	6. 2. 2
Leeds and Northrup 4725	DC Wheatstone Bridge	6. 1. 1
Maxson P-1060	Low Frequency Phase Meter	6. 1. 8
Minneapolis-Honeywell HT 108	Tester, Fuel Gage Tank Unit	6. 1. 3
North Atlantic VM-204-s151	Phase Angle Voltmeter	6. 1. 8
Radio Frequency Labs 1203	Insulation Tester	6. 3
Shallcross 671	Milliohmmeter	6. 1. 1
Sperry 320	Meter, Impedance	6. 2. 1
Sperry 1,000,178	Checker, Continuity, Polar NAV Control	6. 1

6.1 IMPEDANCE AND RELATED MEASURING EQUIPMENT

CHECKER, CONTINUITY, POLAR NAV CONTROL
Part No. 1,000,178
(Sperry Gyroscope Company)



FUNCTIONAL DESCRIPTION:

This equipment is a depot level tool used to check the electrical continuity of the Polar Navigation Control. The Polar Navigation Control is a component of the K-3A, K-4A, MA-6A, and MA-7A type Bombing Navigational Systems.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The continuity checker consists of a metal case on the top of which are mounted five terminal boards which correspond to the jacks on the Polar Navigational Control. Electrical continuity of the Polar Navigation Control circuits is checked at these boards by means of an auxiliary multimeter. Connection to the equipment under test is made through three cable assemblies which attach to one side of the checker case.

Power Supply: None required.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-185992		
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1	
	- Electronics Test Equipment -		Sperry 1,000,178

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

CHECKER, CONTINUITY, POLAR NAV CONTROL
Part No. 1,000,178
(Sperry Gyroscope Company)

MANUFACTURERS' OR CONTRACTORS' DATA:

Sperry Gyroscope Company, Division of Sperry-Rand Corporation, Great Neck, Long Island, New York.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 33D5-5-104-1 (Operation Instructions).
TO 33D5-5-104-4 (Illustrated Parts Breakdown).

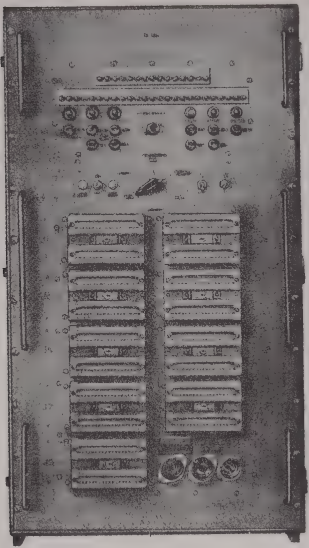
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Checker, Continuity, Polar NAV Control (Sperry 1,000,178)		7CAC-185992	14 (including connectors)	8	3 (including terminal boards)	10
	Including:						
1	Cable Assy. (Sperry 688991)						
1	Cable Assy. (Sperry 688992)						
1	Cable Assy. (Sperry 688993)						

INDICATOR TEST SET AN/GPM-11



FUNCTIONAL DESCRIPTION:

A special purpose, depot test set used to provide semi-automatic continuity and high voltage breakdown testing facilities for J-166/APA-44 Junction Box, PP-185/APA-44 Power Supply, AM-116/APA-44 Amplifier Unit, and AM-118/APA-44 Servo Amplifier Unit which are components of Ground Position Indicator AN/APA-44. Voltage breakdown checks are provided for the C-293/APA-44 Tracking Control Unit and the D-153457 Apparatus Panel.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: In the breakdown test position, a high voltage transformer with a thyratron rectifier provides 500 volts, AC, to the circuits under test. As the equipment switches from one circuit to another during operation, lamps on the front panel indicate which circuit is in the test position. If a fault is located, the

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Alternate Standard		
STOCK NOS.	7CAC-801319-2127		
PROCUREM'T INFO.: USAF Spec. 71-5056-A			
PROCUREM'T COG.: USAF	DESIGN COG.: USAF, Arm.		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 6. 1. 1		
- Electronics Test Equipment -			AN/GPM-11

s project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

150

INDICATOR TEST SET AN/GPM-11

ELECTROMECHANICAL DESCRIPTION: (Continued)
the equipment stops until manually stepped over the defective circuit or until the fault is cleared. The test then continues automatically.

In the continuity test, the circuit under consideration is placed in series with a relay. When a resistance of 75 ohms or greater appears, the relay becomes inoperative, stopping the equipment. The defective circuit is identified, and the test then continues as before.

Power Supply: 115 volts, ±10%, AC, 60 cycles per second, single phase, 1 ampere; 26 to 32 volts, DC, 2 amperes.

Output Power: 500 volts, AC, 60 cycles per second, single phase, 28 volts, DC.

Temperature Range: 0°C. (+32°F.) to +45°C. (+113°F.), operational; -65°C. (-85°F.) to +85°C. (+185°F.), storage.

Humidity Range: Up to 95%, operating or storage.

Altitude Range: Up to 50,000 feet, non-operational.

MANUFACTURERS' OR CONTRACTORS' DATA:
Western Electric Company, 120 Broadway, New York, New York; USAF Contract AF 33(038)-7414; Western Electric Spec. GS-15331; Drawing Index BB-745285; Approximate Cost per Unit, $12,000.00.

TUBE COMPLEMENT:
1 JAN-2D21.

REFERENCE DATA AND LITERATURE:
AN 17-15L-14 (Operation and Maintenance Instructions).

SHIPPING DATA:

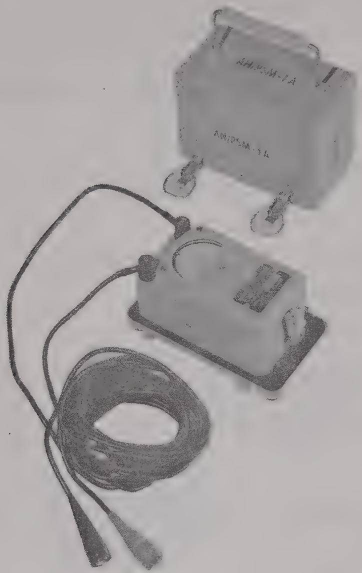
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

INDICATOR TEST SET AN/GPM-11

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Indicator Test Set AN/GPM-11	Steel	7CAC-801319-2127	35-1/2	19-1/2	15-1/2	350
	Including:						
1 each	Cable BX-711599 thru BX-711614						
1	Cable BO-711577			72 long			
1	Cable BO-711522			72 long			
1 each	Connector BO-711615 thru BO-711640						
1	Continuity and High Voltage Test Set GS-15034						

INSULATION TEST SET AN/PSM-1A



UNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained, and self-powered ohmmeter used measure insulation resistance. The meter indicates resistance in megohms. DC esting voltage of 500 volts is available at binding posts when an indicator button lows steadily red.

ELATIONSHIP TO OTHER EQUIPMENT:

Essentially the same as Insulation Test Set AN/PSM-2A except for the resistance ange.

LECTROMECHANICAL DESCRIPTION:

ircuit Information: Consists principally of a hand-cranked AC generator, a terminal board assembly containing selenium rectifier, resistors, capacitor, neon glow lamps and a meter.

ower Supply: Operates from the self-contained hand-cranked AC generator.

esistance Range: 0 to 100 megohms.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		G17-M-30366-2276	
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	
	- Electronics Test Equipment -		AN/PSM-1A

s project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

INSULATION TEST SET AN/PSM-1A

MANUFACTURERS' OR CONTRACTORS' DATA:

Holtzer-Cabot, Division of National Pneumatic Company, Incorporated; Contract No. NObs-53333(1734), 22 November 1950; Approximate Cost per Unit, $150.00; W. F. Sutter, Distributor, 125 Amory Street, Boston 19, Massachusetts.

Mueller Electric Company, 1587 E. 31st Street, Cleveland, Ohio.

United States Rubber Company, 1230 Avenue of the Americas, New York 20, New York.

TUBE COMPLEMENT:

Selenium Rectifier, Standard Signal Corps, Air Force and Navy Stock Number N16C-46350-7092.

REFERENCE DATA AND LITERATURE:

NavShips 91608A (Instruction Book).

TO 16-30PSM1-5 (Instruction Book).

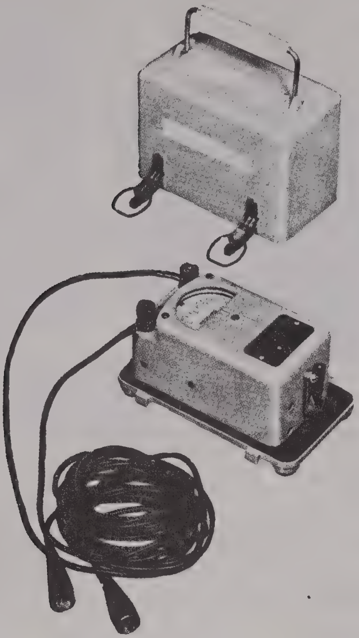
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Insulation Test Set AN/PSM-1A Outer carton containing barrier, inner carton and test set	0.37	9-7/16	9-1/2	7-1/8	8.5

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Insulation Test Set AN/PSM-1A Containing:	Aluminum	G17-M-30366-2276	6-1/4	7-1/4	5	6
1	Carrying Cover CY-269/PSM	Aluminum Alloy		6-1/4	7-1/4	5	
1	Ohmmeter ZM-13/PSM-1			3-21/32	7-1/4	4-5/8	3.5
1	Test Lead, Red CX-1926/U			121-3/4 long			0.25
1	Test Lead CX-1925/U			121-3/4 long			0.25
1	Spare Neon Lamp			1	1/4 dia.		0.01 oz.
2	Instruction Book NavShips 91608A			6-3/8	4-1/4	3/8	0.25

INSULATION TEST SET AN/PSM-2A



UNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained and self-powered high range ohmmeter used to measure insulation resistnce in megohms.

ELATIONSHIP TO OTHER EQUIPMENT:

Essentially the same as AN/PSM-1A and Navy Model OCW except for resistance ange.

LECTROMECHANICAL DESCRIPTION:

ower Supply: Operates from hand-cranked AC Generator. DC testing voltage of 500 volts is available at binding posts when an indicator button glows steadily red.
esistance Range: 0 to 1000 megohms.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-801319-128	G17-M-30366-2334	
PROCUREM'T INFO.: Navy Spec. No. MIL-M-15023 (Ships), 1 December 1949			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	
	- Electronics Test Equipment -		AN/PSM-2A

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

INSULATION TEST SET AN/PSM-2A

MANUFACTURERS' OR CONTRACTORS' DATA:

Holtzer-Cabot Division of National Pneumatic Company, Incorporated, Boston, Massachusetts; Contract NObs-53333(1734), 22 November 1950; Approximate Cost per Unit, $150.00; Contract NObs-53581(1734), 4 January 1951; Approximate Cost per Unit, $131.00; Contract No. N14OS-25893-B, 22 March 1951; Approximate Cost per Unit, $131.00; Walter F. Sutter, Distributor, 125 Amory Street, Boston 19, Massachusetts.

TUBE COMPLEMENT:

Selenium Rectifier, Standard Signal Corps, Air Force and Navy Stock No. N16C-46350-7092.

REFERENCE DATA AND LITERATURE:

Navships 91430 (Instruction Book).
TO 16-30PSM1-5 (Instruction Book).

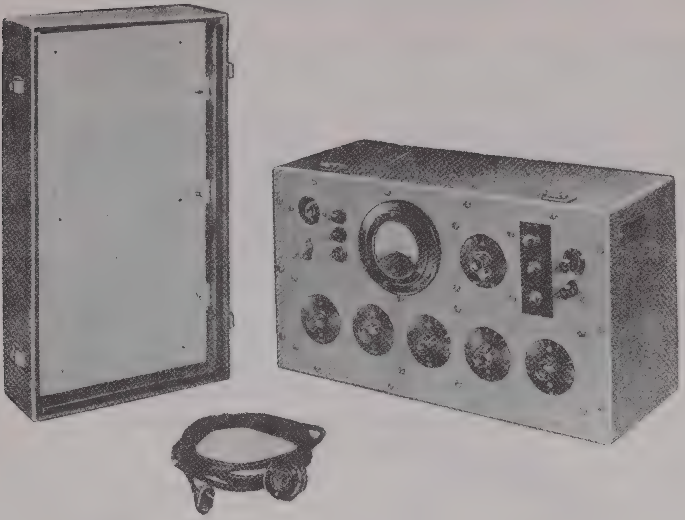
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Insulation Test Set AN/PSM-2, Outer carton containing barrier, inner carton and test set	0.37	9-7/16	9-1/2	7-1/8	8.5

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Insulation Test Set, AN/PSM-2A Containing:	Aluminum	7CAC-801319-128 G17-M-30366-2334	6-1/4	7-1/4	5	6
1	Cover CW-269/PSM						
1	Ohmmeter ZM-14/PSM-2			3-21/32	7-1/4	4-5/8	3.5
1	Test Lead, Red CX-1926/U			121-3/4 long			0.25
1	Test Lead, Black CX-1925/U			121-3/4 long			0.25
1	Spare Neon Lamp			1	1/4 dia.		0.01 oz.
2	Instruction Book NavShips 91430			6-3/8	4-1/4	3/8	0.25

RESISTANCE BRIDGE SET AN/USM-18



UNCTIONAL DESCRIPTION:

A portable, special purpose depot test set of the Wheatstone bridge type used for recision resistance measurement. A null indicating microammeter is provided. his set is specifically designed to measure the resistors in Ground Position Indi-ator AN/APA-44.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: This set consists of a Wheatstone bridge circuit with a direct current amplifier in the indicator circuit to increase sensitivity and to permit use of a rugged indicating meter. A conventional full-wave rectifier and a voltage regulator supply DC voltage from the AC source.

ower Supply: 90 to 130 volts, AC, 50 to 400 cycles per second, single phase; 90 volts, DC, supplied by 2 Burgess Batteries No. Z30NX (45 volts, DC); 4.5 volts, DC, supplied by 1 Burgess Battery No. 5360 (4.5 volts, DC).

esistance Range: 0.001 ohm to 10,000,000 ohms, in five ranges by multiples of ten.

ccuracy: ±0.1% above 10,000 ohms; ±0.25% below 10,000 ohms.

emperature Range: +25°C. (+77°F.), operating; -65°C. (-85°F.) to +85°C. (+185°F.), storage.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Alternate Standard		
TOCK NOS.	7CAC-138760		
ROCUREM'T INFO.: USAF Spec. No. 71-5056-A			
ROCUREM'T COG.: USAF		DESIGN COG.: USAF, Arm.	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	
	- Electronics Test Equipment -		AN/USM-18

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A

RESISTANCE BRIDGE SET AN/USM-18

ELECTROMECHANICAL DESCRIPTION: (Continued)
Humidity Range: Up to 95%, operating or storage.
Altitude Range: Up to 50,000 feet, storage.

MANUFACTURERS' OR CONTRACTORS' DATA:

Western Electric Company, 120 Broadway, New York, New York; USAF Contract AF 33(038)7414; Western Electric Company Specification GS-153329; Drawing Index BB-745283.

TUBE COMPLEMENT:

1 JAN-6SL7, 2 JAN-5651, 1 JAN-6X4.

REFERENCE DATA AND LITERATURE:

TO 33A1-12-5-1 (Operation and Maintenance Instructions).

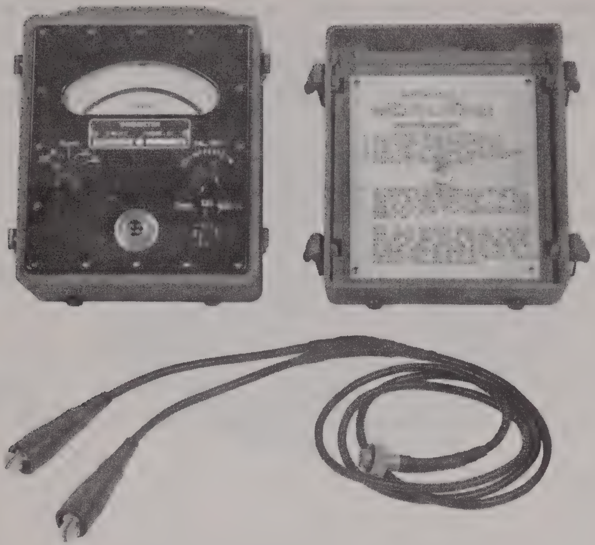
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Resistance Bridge Set AN/USM-18	Aluminum	7CAC-138760	17-1/2	11-11/16	9-9/16	25
	Including:						
1	Megohm Bridge GS-15036						
1	Cable BO-711522-2			72 long			

OHMMETER AN/USM-21



FUNCTIONAL DESCRIPTION:

A portable, precision, general purpose, ohmmeter capable of measuring low resistances directly by means of a meter indication calibrated in ohms. This ohmmeter is used in field and depot maintenance of radio, radar, and other electrical and electronic equipment. It is particularly useful in measuring resistances of re-ay and switch contacts, antenna connections, and electrical bonding.

RELATIONSHIP TO OTHER EQUIPMENT:

The measurement function of this ohmmeter is similar to that of the lower ranges of the Test Set I-49, except that: (a) the current required through the resistance under test is approximately 5% of that required for proper operation of the Test Set -49; (b) this ohmmeter is more rugged than Test Set I-49; and (c) this ohmmeter has better accuracy at extremes of temperature, and is more simple to operate han the Test Set I-49.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.: USAF Exhibit MCREE-720, dated 28 Dec. 1949.			
PROCUREM'T COG.: USAF	DESIGN COG.: USAF, C&N		
.I.I.N.:	FUNCTIONAL CLASS. NO.: 6.1.1		
- Electronics Test Equipment -			AN/USM-21

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

OHMMETER AN/USM-21

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The basic principle of the ohmmeter circuit is that of a constant current generator in series with the resistance under test, and a sensitive voltmeter (calibrated in ohms) indicating the voltage drop across the resistance under test. Since the current is a known constant, the resistance under test is directly proportional to the voltage developed across it. Overload protection is provided.

Power Supply: 1.5 volts, supplied by one battery, BA-30 (1.5 volt).

Resistance Range: 0 to 0.1, 1.0, 10 ohms. Minimum readable value is 0.001 ohms.

Maximum Allowable Current: 100 milliamperes (0 to 0.1, 1.0 ohm ranges); 50 milliamperes (0 to 10 ohm range).

Accuracy: ±1% of indicated resistance over operational temperature range.

Temperature Range: -40°C. to +55°C., operational.

MANUFACTURERS' OR CONTRACTORS' DATA:

Industrial Instruments, Inc., Jersey City, New Jersey; Contract AF33(038) 13237, dated 1 June 1950; Approximate Cost per Unit, $350.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

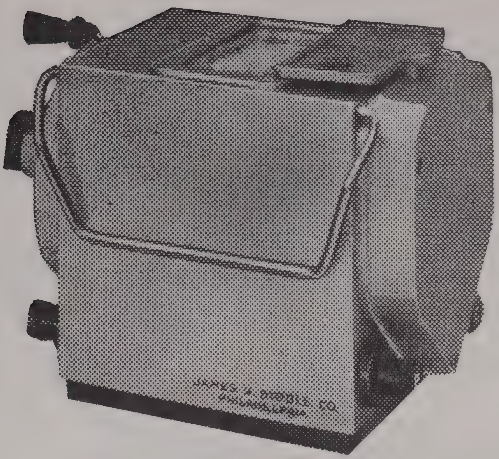
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ohmmeter AN/USM-21 Including:	Aluminum		8-3/8	7-1/2	5-3/4	11
1	Ohmmeter ZM-12/USM-21						
2	Lead, Test CX-2571/USM-21						

MEGGER GROUND TESTER AN/USM-51



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained equipment used for measuring the resistance to earth of installed ground connections and for measuring the average resistivity of earth; for location and cathodic protection of pipelines and other underground structures; and for electrical methods of geophysical prospecting. Test results are indicated directly in ohms on a calibrated scale.

RELATIONSHIP TO OTHER EQUIPMENT:

The AN/USM-51 is the service designation for Megger Ground Tester Biddle 571.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit consists essentially of a DC generator, an ohmmeter, a current-reversing commutator, and a potential rectifier. The handcranked generator is of the 2-pole, permanent-magnet type utilizing free wheeling in

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6. 1. 1	
	- Electronics Test Equipment -		AN/USM-51

MEGGER GROUND TESTER AN/USM-51

ELECTROMECHANICAL DESCRIPTION: (Continued)

the driving-gear mechanism. The generator provides a source of current supply for the tester. The meter is of the cross-coil type with attached pointer suspended in the field of a permanent magnet. The reversing commutator, a mechanical device, alternates the polarity of the current from the generator. A potential rectifier recitfies the voltage before it passes through the deflecting coil of the ohmmeter. The current reverser and potential rectifier are mounted on the same shaft and run in synchronism at all speeds.

Power Supply: Operates from built-in band generator.

Range: 0 to 60 and 0 to 600 ohms.

Accuracy: ±1/32 inch or ±1% full-scale deflection.

MANUFACTURERS' OR CONTRACTORS' DATA:

James G. Biddle Company, 1316 Arch Street, Philadelphia 7, Pennsylvania; Approximate Cost per Unit, $296.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Bulletin 25.

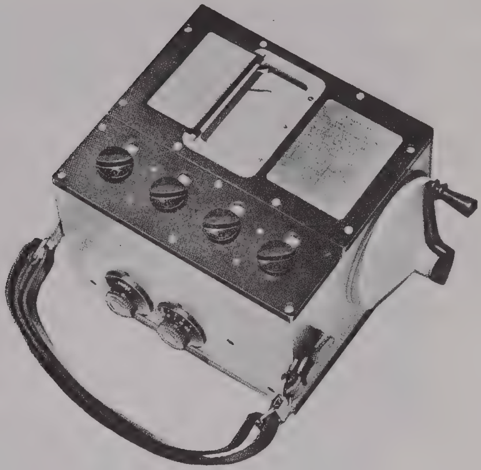
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Megger Ground Tester AN/USM-51	alum-inum		5	9-1/4	6-1/4	8

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Megger Ground Tester AN/USM-51					

INSULATION AND RESISTANCE TESTER AN/USM-52



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained unit used to measure conductor and insulation resistance, and to detect, diagnose, and locate faults in electrical power systems. Test results are indicated by means of an ohmmeter and calibrated dials. Distance to a fault is computed by proper formulas during Varley-loop tests.

RELATIONSHIP TO OTHER EQUIPMENT:

The AN/USM-52 is the service designation for Megger Insulation and Resistance Tester Biddle 658.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit consists basically of a direct-reading ohmmeter for measuring insulation resistance, a Wheatstone bridge for measurements of conductor resistance, a handcranked DC generator to supply test current, and a

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.: Navy		DESIGN COG.: Navy	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6. 1. 1	
	- Electronics Test Equipment -		AN/USM-52

INSULATION AND RESISTANCE TESTER AN/USM-52

ELECTROMECHANICAL DESCRIPTION: (Continued)

switching circuit to permit selection between insulation resistance and Wheatstone bridge functions. The ohmmeter is of the permanent-magnet, cross-coil, pivot and jewel, pointer type, which is independent of the voltage supplied for the test. During Wheatstone bridge functions, the ohmmeter serves as the galvanometer. The hand generator is of the 2-pole, permanent-magnet, constant-voltage type. The constant-voltage feature is provided by means of a slip clutch built into the driving mechanism. Magnets for both ohmmeter and generator are of high-percentage cobalt steel.

Power Supply: Operates from built in hand generator.

Resistance Ranges:
- Insulation: 0 to 200 megohms.
- Conductor: 0.01 to 999,900 ohms.

Test Voltages:
- Insulation: 1000 volts DC.
- Conductor: 350 volts DC.

MANUFACTURERS' OR CONTRACTORS' DATA:

James G. Biddle Company, 1316 Arch Street, Philadelphia 7, Pennsylvania; Approximate Cost per Unit, $396.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Bulletin 21-60.

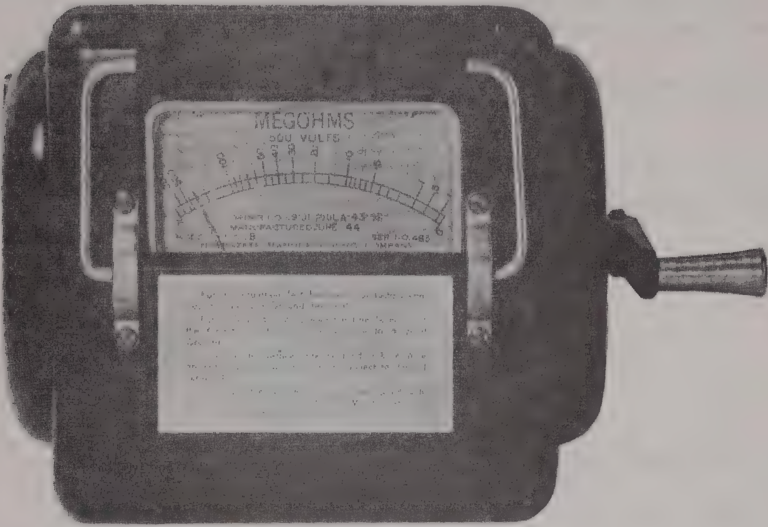
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Insulation and Resistance Tester AN/USM-52	aluminum		12	8-3/4	7	15

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Insulation and Resistance Tester AN/USM-52.					20

TEST SET I-48-B
(OHMMETER, I-48-B)



UNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained and self-powered megger or high-
ange ohmmeter of special design used for checking insulation resistance of cables
etween conductors of multiple cables, between windings and windings to ground in
ansformers or rotating equipment, etc.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to Biddle No. 7679.
Similar to I-48 except for resistance range.
Similar to I-48-A except that I-48-A is equipped with a 1 to 10 ratio switch.

LECTROMECHANICAL DESCRIPTION:

ower Supply: Operates from built-in hand generator, 500 volt constant pressure type.

ange: 0 to 1000 megohms.

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.	7CAC-595560	N16-T-1732-14	3F4048B
ROCUREM'T INFO.: Army Spec. No. 71-3256, Dwg. No. 1058			
ROCUREM'T COG.: Army		DESIGN COG.: Army, CSL	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	
- Electronics Test Equipment -			I-48-B

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Betheada, Md. - Multilithed in U. S. A.

166

TEST SET I-48-B
(OHMMETER, I-48-B)

MANUFACTURERS' OR CONTRACTORS' DATA:

Interstate Manufacturing Company, 125 Sussex Avenue, Newark 4, New Jersey; Order Nos. 29191-Phila-43-52, 31080-Phila-43, 34909-Phila-43, 8724-Phila-44, 28629-Phila-44; Approximate Cost per Unit, $150.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-40I48-5 (Instruction Book).

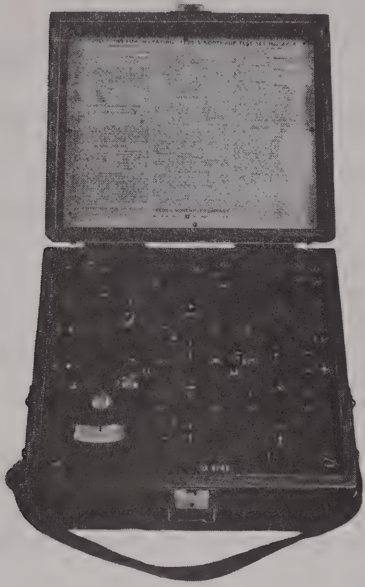
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches) H	W	D	Weight Packed (Lbs.)
1	Test Set I-48-B (Export Packed)	0.9				29.75

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches) H	W	D	Weight (Lbs.)
1	Test Set I-48-B	Plastic	7CAC-595560 N16-T-1732-14 3F4048B	6	7-3/4	7-3/4	10.7
2	Test Lead		3E8001-100	120 long			1.3
1	Carrying Case	Wood	3F2573-20	6-1/2	9-3/4	8-1/2	2.7

TEST SET I-49
(TEST SET, TELEPHONE, I-49)



FUNCTIONAL DESCRIPTION:

A portable, general purpose Wheatstone Bridge designed for locating faults in communication circuits. Faults which may be identified and located are opens, short circuits, crosses, and grounds; faults which may be identified and measured are resistance unbalance and low insulation resistance. Null is indicated on a self-contained galvanometer. Binding posts are provided for external batteries and an external galvanometer.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Leeds and Northrup 5430A Type U Test Set.

ELECTROMECHANICAL DESCRIPTION:

Power Supply:

Internal: 4.5 volts, DC, supplied by three 1.5 volt Batteries BA-30.

External: Up to 200 volts, DC. However, when an external voltage exceeding 45 volts is used an external resistance of 10 ohms for each volt must be placed

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	1600-327406000	F16-B-87142-6041	3F4049
PROCUREM'T INFO.:	Army Spec. 71-110		
PROCUREM'T COG.:	Army	DESIGN COG.: Army, CSL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	

s project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

ELECTROMECHANICAL DESCRIPTION: (Continued)

in series with the test set and the voltage source.

Resistance Range: 0 to 10 megohms.

Rheostat Decades: 0 to 10, 110 ohms in steps of 1 ohm and a position for infinity setting.

Ratio Dial Multiplying Values for Resistance Measurements and Varley Loop Tests: 1/1000, 1/100, 1/10, 1/9, 1/4, 1, 10/1, and 100/1.

Ratios for Murray Loop Tests: M1000, M100, M10.

Current Rating of Rheostat Arm (Determined by Highest Decade in Use):
1 ohm decade: 0.7 ampere.
10 ohm decade: 0.2 ampere.
100 ohm decade: 0.07 ampere.
1000 ohm decade: 0.02 ampere.

Galvanometer Sensitivity: 1.0 microampere per scale division.

Galvanometer Coil Resistance: 250 ohms.

Accuracy of Ratio Resistors: ±0.05%.

Accuracy of Rheostat Resistors: ±0.1%.

MANUFACTURERS' OR CONTRACTORS' DATA:

Leeds and Northrup Company, 4970 Stenton Avenue, Philadelphia 44, Pennsylvania; Approximate Cost per Unit, $180.00, October 1950.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TM 11-2019 (Instruction Book).

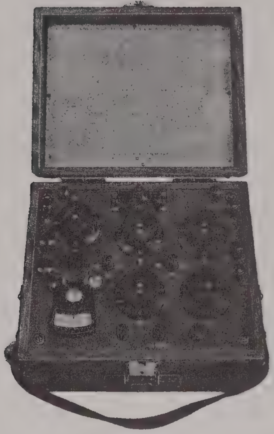
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set I-49	1.0				19.5

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set I-49	Oak	1600-327406000 F16-B-87142-6041 3F4049	5-3/4	8-7/8	7-3/8	8

TEST SET I-49-B



FUNCTIONAL DESCRIPTION:

A portable, general purpose Wheatstone bridge used to locate, identify, and measure faults in communication cable circuits. The faults which may be identified and located are opens, short circuits, and grounds. Faults which may be identified and measured are resistance unbalance and low insulation resistance. These faults and measurements are determined by Wheatstone bridge, Murray, Varley, or Hillborn loop tests. With associated test equipment the unit can be used to locate opens by capacitance tests. The unit is used at field maintenance level. Basic test results are indicated on direct-reading dials; more complicated tests require the use of appropriate algebraic calculations.

RELATIONSHIP TO OTHER EQUIPMENT:

The Test Set I-49-B is similar to and electrically interchangeable with the I-49-A and I-49 except for maintenance parts and manufacturer. The I-49-A is manufactured by the Shallcross Manufacturing Company and is the Shallcross 6100.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	

RELATIONSHIP TO OTHER EQUIPMENT: (Continued)

The I-49 is manufactured by the Leeds and Northrup Company and is the Leeds and Northrup 5430 type A. The I-49 is similar to the Resistance Bridge ZM-4B/U and ZM-4A/U except that the ZM-4B/U has different switch locations, binding posts which will accept banana type plugs, and a rotary switch for various loop tests and for resistance measurements. The I-49-B is part of Meter Test Equipment AN/GSM-1.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set consists basically of a Wheatstone bridge and a galvanometer. The Wheatstone bridge utilizes four resistances connected to form a series-parallel circuit. The bridge is balanced by means of a decade bridge circuit. Bridge balance is indicated by a null reading on the galvanometer.

Power Supply: 4.5 volts DC supplied by three 1.5 volt Batteries BA-30.

Input Voltage: To 200 volts DC.

Resistance Range: 0.001 to 50,000 ohms using internal battery; 0.001 to 1,011,000 ohms using external DC source.

Accuracy: ±0.1%±0.01 ohm for resistance measurements; ±0.05% ratio resistance accuracy for Murray loop tests.

Rheostat Decades: 0 to 10, 110 ohms in 1 ohm steps.

Galvanometer Sensitivity Multipliers: 0.01, 0.1, and 1.

MANUFACTURERS' OR CONTRACTORS' DATA:

Winslow Company, Inc. 9 Liberty Street, Newark 5, New Jersey.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

SC Form 567.

SHIPPING DATA:

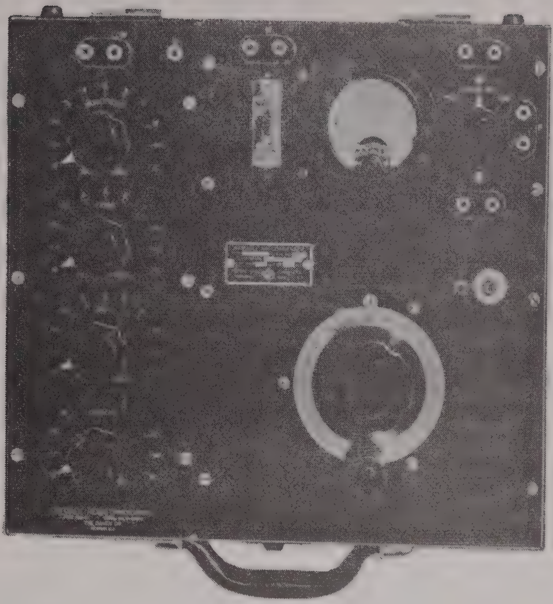
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Test Set I-49-B					

TEST SET I-49-B

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set I-49-B	oak		8-3/4	7-1/4	5-3/4	8

TEST SET TS-269A/UR



UNCTIONAL DESCRIPTION:

A portable, general purpose measuring device used for measuring RF resistance uring adjustments of RF networks and antenna systems. It is intended primarily or use in the adjustment of radio range antenna systems using Adcock type vertical adiators, but may be used in the adjustment of other types of antenna systems. The et is also useful in establishing the correct termination for a transmission line. easurements are made by the substitution method. RF power must be supplied at he measurement frequency by an external source. Indication is provided by decade esistor dials, a variable capacitor control, and an RF milliammeter dial.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: Includes a variable coupling control and a substitution switch. Resonance is established with the unknown resistance in the circuit by varying

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-T-20242-1152	3F4325-269A

PROCUREM'T INFO.: Spec. MIL-T-10306 (SigC) dated 18 May 1950.

PROCUREM'T COG.: Army DESIGN COG.: Army, CSL

F.I.I.N.: FUNCTIONAL CLASS. NO.: 6.1.1

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

ELECTROMECHANICAL DESCRIPTION: (Continued)

the capacitance in the test set. The variable coupling is used to limit the meter current to safe values. Then the meter coupling is adjusted until a suitable reading is obtained. The decade resistor is substituted for the unknown, and resonance again established by varying the capacitance, while the decade resistance is used as a current limiter for the meter. After obtaining resonance, the decade resistance is varied until the previous suitable meter reading is obtained.

Power Supply: None.

Frequency Range: Approximately 130 to 180 kilocycles per second.

Nominal Resistance Range: 0.1 to 1,111 ohms, variable in 0.1 ohm steps.

Power Input: RF sine wave energy input required, 10 watts maximum, at the measurement frequency.

Milliammeter Indicating Range: 0 to 250 milliamperes.

Coupling Coil Secondary Inductance: Approximately 400 microhenries.

Coupling Coil Primary: Variable coupling, low impedance for RF injection.

Variable Capacitor Range: 40 to 1000 micromicrofarads calibrated in percentage of this range.

Fixed Capacitors: 1000 micromicrofarads and 2000 micromicrofarads.

Decade Resistor Current Rating: 80 milliamperes, maximum.

Accuracy: ±1%, overall.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Massachusetts; Army Order No. 1252-Phila-42.

The Daven Company, 191 Central Avenue, Newark 4, New Jersey.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TM 11-2523 (TO 16-35TS269-5) (Instruction Book).

SHIPPING DATA:

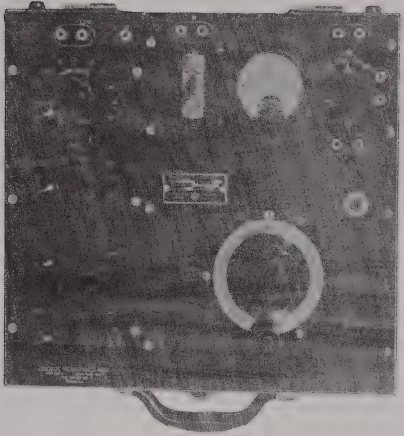
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set TS-269A/UR including accessories (Export Packed)	2.88	16-1/2	18-1/4	16-1/2	54.5

TEST SET TS-269A/UR

QUIPMENT SUPPLIED:

uant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches) H	W	D	Weight (Lbs.)
1	Test Set TS-269A/UR Including:	Metal	F16-T-20242-1152 3F4325-269A	10	14-3/8	13-1/4	26.5
12	Fuses, 0.375 amperes (Spares) Type 3AG Littlefuse No. 1005		3Z2586				
4	Connecting Lead						
1	Precision Fixed Capacitor 0.001 µf ±1%						
1	Precision Fixed Capacitor 0.002 µf ±1%						
2	Technical Manual TM 11-2523						

TEST SET TS-269B/UR



FUNCTIONAL DESCRIPTION:

A portable, general purpose device used for measuring RF resistance during adjustments of RF networks and antenna systems. The device is primarily inten-ded for use in the adjustment of radio-range antenna systems using Adrock-type vertical radiators, but may also be used to adjust other types of antenna systems. The set is also useful in establishing the correct termination for a transmission ine. Measurements are made by the substitution method. RF power must be sup-plied at the measurement frequency by an external source. Indication is provided by decade resistor dials, a variable capacitor control, and an RF milliammeter dial.

RELATIONSHIP TO OTHER EQUIPMENT:

The TS-269B/UR is functionally interchangeable with the TS-269/UR and the TS-269A/UR. The TS-269B/UR is similar to the TS-269A/UR except that three of the four decade-resistor units are inductance compensated, the meter is her-metically sealed, the fuse is mounted externally, and the size of the case differs.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
TOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:	DESIGN COG.: Army, SCEL, CSL		
C.I.I.N.:	FUNCTIONAL CLASS. NO.: 6.1.1		
	- Electronics Test Equipment -		TS-269B/UR

TEST SET TS-269B/UR

RELATIONSHIP TO OTHER EQUIPMENT: (Continued)

The TS-269A/UR uses a General Radio 722-D variable capacitor and the TS-269/UR uses a General Radio 539-K variable capacitor.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set includes a variable-coupling control and a substitution switch. Resonance is established with the unknown resistance in the circuit by varying the capacitance in the test set. The variable coupling is used to limit the meter current to safe values. The meter coupling is then adjusted until a suitable reading is obtained. The decade resistor is substitued for the unknown, and resonance is re-established by varying the capacitance while using the decade resistance as a current limiter for the meter. After resonance is obtained, the decade resistance is varied until it equals the suitable meter reading obtained earlier.

Power Supply: None.

Frequency Range: 130 to 180 kilocycles per second, approximately.

Nominal Resistance Range: 0. 1 to 1111 ohms, variable in 0. 1 ohm steps.

Power Input: 10 watt minimum sine wave energy input required at measurement frequency.

Milliammeter Indicating Range: 0 to 250 milliamps.

Coupling-Coil Secondary Inductance: Approximately 400 microhenries.

Coupling-Coil Primary: Variable coupling, low impedance for RF injection.

Variable-Capacitor Range: 25 to 1100 micromicrofarads (to 4100 micromicrofarads with two fixed capacitors).

Fixed Capacitors: 1000 and 2000 micromicrofarads.

Decade-Resistor Current Rating: 80 milliamps, maximum.

Accuracy: ±1% overall.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, Baker Avenue, West Concord, Massachusetts.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TS-269B/UR, SC Form 567.

SHIPPING DATA:

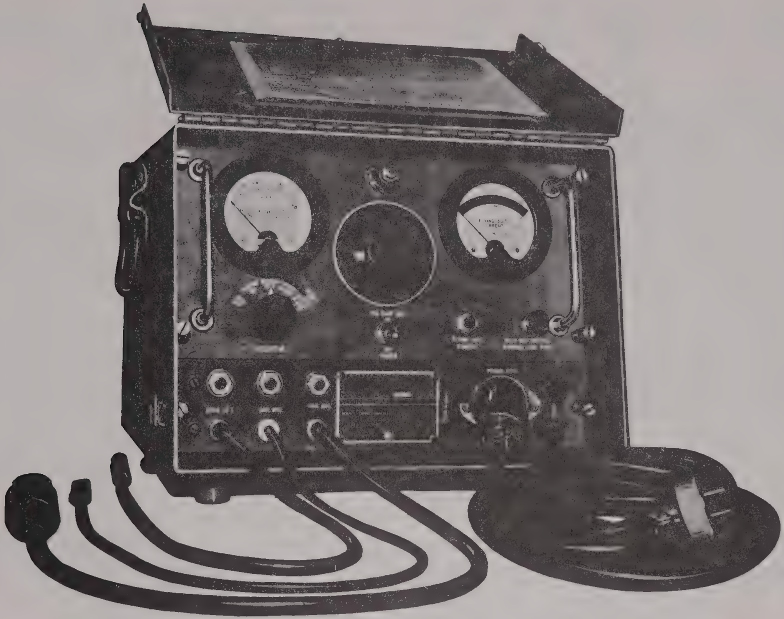
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Test Set TS-269B/UR					

TEST SET TS-269B/UR

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set TS-269B/UR	metal		15-3/4	14-1/2	8-3/4	
8	Connecting Lead						
1	Precision Fixed Capacitor 0.001 microfarads ±1%						
1	Presision Fixed Capacitor 0.002 microfarads ±1%						
1	Technical Manual						

TEST SET TS-387/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used to check flight suit, boot, and glove circuits for resistance, shorts, and opens. In addition the unit may also be used to check headsets for sensitivity, noise, and for correct matching of two headset units. Provision is also made for checking the sensitivity of carbon and magnetic microphones. Test results are indicated by a panel lamp and meters located on the front panel of the test set.

RELATIONSHIP TO OTHER EQUIPMENT:

The TS-387/U supersedes Headset and Microphone Tester NAF 67073-1, (ASO) S/N R16-T-1697.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set consists of a filament and plate power supply, an audio oscillator, an audio amplifier, a voltage control and supply circuit, and switching and indicating devices.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.		F16-Q-304457-100	3F 4325-387
PROCUREM'T INFO.: Spec BuAer, EP-383			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy	
F.I.I.N.: 6625-338-6749		FUNCTIONAL CLASS. NO.: 6.1.1	

TEST SET TS-387/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 105 to 125 volts, AC, 50 to 1600 cycles per second, single-phase, 0.6 amp.

Audio Oscillator Frequency: 1000 ±20 cycles per second.

Audio Amplifier Output Impedance: 600 ohms.

Output Voltage: 24 volts AC.

Ammeter Calibration:

Low Range: 0 to 3 amps (green section 1.8 to 2.5 amps).

High Range: 0 to 9 amps (two green sections, 4.9 to 6.4 amps and 7.2 to 8.7 amps).

Voltmeter Calibration: 24 volts center scale.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hickok Electrical Instrument Company, 10555 Dupont Avenue, Cleveland, Ohio; Contract No. N383a-60229; Approximate Cost per Unit, $242.00.

TUBE COMPLEMENT:

1 6N7GT, 2 6SJ7, 1 6V6GT, 1 6X5GT.

REFERENCE DATA AND LITERATURE:

AN 16-35TS387-3 Handbook of Maintenance Instructions.

SHIPPING DATA:

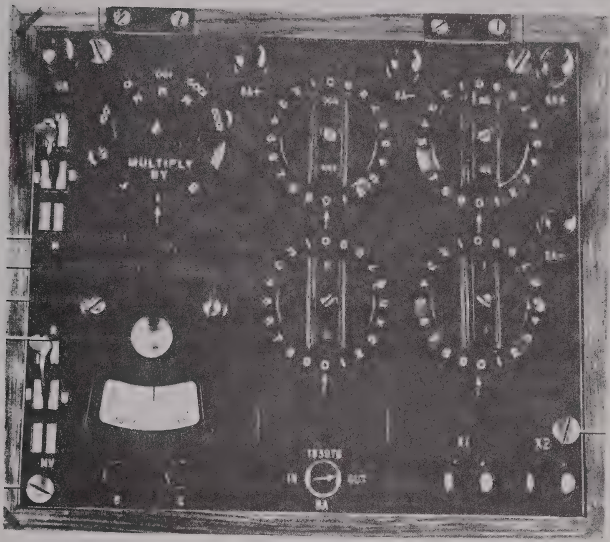
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	TEST SET TS-387/U					

TEST SET TS-387/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set TS-387/U			10-1/8	13-5/8	18	55
1	AC Cord			120 long			
1	Allen Wrench No. 8						
1	Allen Wrench No. 10						
2	Spare Fuses			1	1/4 dia.		

RESISTANCE BRIDGE ZM-4/U



UNCTIONAL DESCRIPTION:

A portable, general purpose Wheatstone bridge desgined primarily to measure esistances when locating faults which occur in conductors used for communication ystems and those used for power transmission. It can also be used to measure the esistance of any fixed resistor. Null is indicated on a self-contained galvanometer. inding posts are provided for an external null indicator and for external batteries.

ELATIONSHIP TO OTHER EQUIPMENT:

Same as the Leeds and Northrup Type S Test Set.

LECTROMECHANICAL DESCRIPTION:

ower Supply: 4.5 volts, DC, supplied by three 1.5 volt Batteries BA-30.
esistance Range: 1.0 ohm to 10 megohms.
atio Dial Multiplying Values for Resistance Measurements and Varley Loop Tests: 0.001, 0.01, 0.1, 1.0, 10, 100, and 1000.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Standard		
TOCK NOS.	7CAC-140100	F16-B-87145-3926	3F4020. 2
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	
	- Electronics Test Equipment -		ZM-4/U

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

RESISTANCE BRIDGE ZM-4/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Ratios for Murray Loop Tests: M1000, M100, M10.

Rheostat Decades: 9(1 + 10 + 100 + 1000) ohms.

Current Rating of Rheostat Arm: Determined by highest decade in use:

1.0 ohm decade: 0.5 ampere.	10 ohm decade: 0.16 ampere.
100 ohm decade: 0.05 ampere.	1000 ohm decade: 0.016 ampere.

Galvanometer Sensitivity: 1.0 microampere per scale division.

Accuracy: ±0.15% of indicated resistance.

MANUFACTURERS' OR CONTRACTORS' DATA:

Leeds and Northrup Company, 4970 Stenton Avenue, Philadelphia 44, Pennsylvania; Contract Nos. NObsr-49097, dated 31 May 1950, and NObsr-39216, dated 31 May 1950; Approximate Cost per Unit, $90.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

NavShips 91073(A) (Instruction Book).

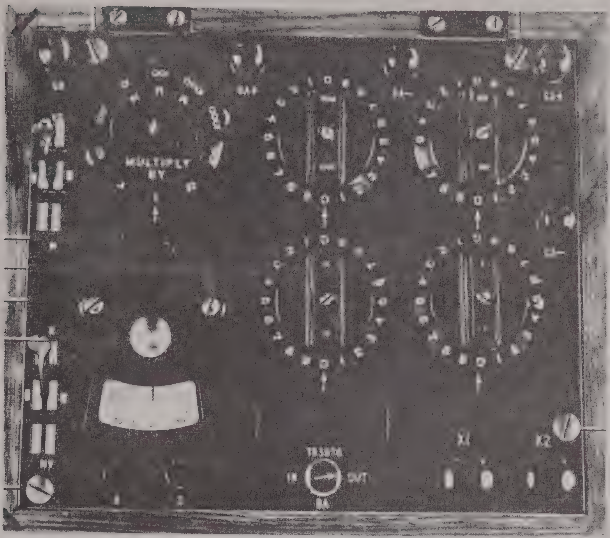
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Resistance Bridge ZM-4/U (Export Packed)	1.7	10	18	16	45

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Resistance Bridge ZM-4/U	Oak	7CAC-140100 F16-B-87145-3926 3F4020.2	5-5/8	9	7-1/2	8
2	Instruction Book NavShips 91073(A)						

RESISTANCE BRIDGE ZM-4B/U



UNCTIONAL DESCRIPTION:

A portable, general purpose Wheatstone bridge designed primarily to measure esistances when locating faults which occur in conductors used for communication ystems and those used for power transmission. It can also be used to measure the esistance of any fixed resistor. Null is indicated on a self-contained galvanometer. inding posts are provided for an external null indicator and for external batteries.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to I-49 and ZM-4/U except that the ZM-4B/U has different type binding osts and switches.

LECTROMECHANICAL DESCRIPTION:

ower Supply: 4.5 volts, DC, supplied by three 1.5 volt Batteries BA-30.
esistance Range: 0.001 to 1,011,000 ohms.
atio Dial Multiplying Values for Resistance Measurements and Varley Loop Tests: 1/1000, 1/100, 1/10, 1/9, 1/4, 1, 10, and 100.
atio for Murray Loop Tests: M1000, M100, M10.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-140125		
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RESISTANCE BRIDGE ZM-4B/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Rheostat Decades: 10(1 + 10 + 100) + 9(1000) ohms.
Galvanometer Sensitivity: 1.0 microampere per scale division.
Accuracy: ±0.1% of indicated resistance.

MANUFACTURERS' OR CONTRACTORS' DATA:

Shallcross Manufacturing Company, Collingdale, Pennsylvania; Part/Dwg. No. 6100; Order Nos. 6870-PH-51, 19629-PH-50; Contract No. NObsr-52216.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

33A1-12-15-1 (TM 11-2019 & C1) (Operating Instructions).

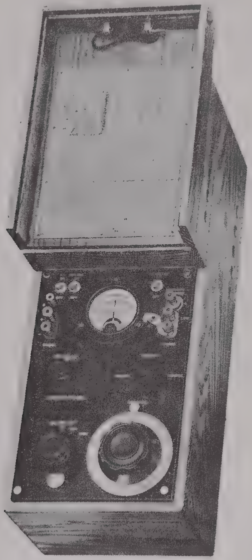
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Resistance Bridge ZM-4B/U (Export Packed)	1.7	10	18	16	45

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Resistance Bridge ZM-4B/U	Aluminum	7CAC-140125	5-3/4	8-3/4	7-1/4	8
2	Instruction Book						

RESISTANCE BRIDGE ZM-9/U
(BRIDGE, RESISTANCE, ZM-9/U)



FUNCTIONAL DESCRIPTION:

A portable, general purpose megohm bridge, which directly measures resistance up to one million megohms. All controls, indicators, and connectors are on the front panel. A logarithmically calibrated megohm control knob varies the resistance in one arm of the bridge. A multiplier switch inserts different amounts of resistance into another arm of the bridge. A microammeter dial calibrated as a galvanometer indicates when balance is approached. A zero-adjust knob assures correct zero position of the null indicator before balance procedure is attempted. Toggle switches put power supply, bridge, and detector, respectively, into the circuit. A three-position switch provides for checking the galvanometer zero position, charging the element to be measured with normal operating voltage, and operating the bridge. Binding posts are provided for connection of power supply and unknown resistance.

This bridge is useful in measuring the resistances of cartridge-type resistors, insulation resistances of generators, meters, transformers, rheostats, single

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-137800	F16-Q-304748-100	3F2009-1
PROCUREM'T INFO.: Army Spec. 71-3383			
PROCUREM'T COG.: Army		DESIGN COG.: Army, CSL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	
- Electronics Test Equipment -			ZM-9/U

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RESISTANCE BRIDGE ZM-9/U
(BRIDGE, RESISTANCE, ZM-9/U)

FUNCTIONAL DESCRIPTION: (Continued)

conductors, cables, capacitors, high-voltage cables, and slabs of insulating materials Volume resistivity and its change with temperature and humidity can be determined Guard connections provide for measurement of three-terminal resistors specimen of insulating material. Dielectric absorption effects can be measured and chargin current curves can be obtained over widely varied time intervals.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to General Radio Type 544-B Megohm Bridge.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The basic circuit consists of a Wheatstone bridge modified t include multiplier resistors in one resistance arm, and a vacuum tube voltmeter indicator circuit to provide sufficient amplification.

Power Supply: Two types are available:

(1) AC Supply:
105 to 125 volts or 210 to 250 volts, AC, 40 to 60 cycles per second, single phase, 60 watts (including test voltages of 100 and 500 volts, DC, to the bridge).

(2) Battery Supply:
45 volts, DC, 67.5 milliamperes (1 Burgess No. 5308).
90 volts, DC, test voltage (2 Burgess No. 5308).

(Test voltage can also be obtained from a separate source up to 500 volts, DC.)

Resistance Measuring Range: 0.1 to 1,000,000 megohms, covered by a dial and a 5-position multiplier switch (x 0.1, x 1, x 10, x 100, x 1000). The dial is calibrated from 0.9 to 1000 on an approximately logarithmic scale.

Accuracy: ±3% on the 0.1, 1, and 10 multipliers.
±4% on the 100 and 1000 multipliers.
Above 10,000 megohms, the accuracy is essentially that with which the megohm dial can be read.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, Cambridge, Massachusetts; Approximate Cost per Unit, with AC Supply, $350.00; with Batteries and Battery Supply, $250.00.

TUBE COMPLEMENT:

With Battery Supply: 1 JAN-1D5GP.

With AC Supply: 1 JAN-6K7G, 1 JAN-6J5G, 2 Type 2LAG-949, 1 JAN-6X5G, 1 JAN-6K6G, 1 JAN-5U4G, 1 JAN-4A1.

REFERENCE DATA AND LITERATURE:

Manufacturer's Operating Instructions.

RESISTANCE BRIDGE ZM-9/U
(BRIDGE, RESISTANCE, ZM-9/U)

HIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Resistance Bridge ZM-9/U	Shielded Oak	7CAC-137800 F16-Q-304748-100 3F2009-1	8	8-1/2	22-1/2	With Batteries 29.5
With AC Supply:							With AC Supply 26.4
1	Line-Connector Cord			84 long			
5	Spare Fuse						
1	Test Probe						
1	Spare Neon Ballast Tube						

OHMMETER ZM-17/U

UNCTIONAL DESCRIPTION:

A portable, general purpose low range ohmmeter which measures the voltage rop across the unknown resistor while utilizing a known current. May be used for esting electrical bonds on airplanes, contact resistance of switches, circuit breakrs, bar to bar resistance of commutators. Measurements are made on a calibrated cale in ohms.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to Shallcross Type 673-D Ohmmeter.

LECTROMECHANICAL DESCRIPTION:

ircuit Information: Utilizes the four terminal method of measuring resistances. Ranges are selected by a switch, and values are read directly from multiple scales.

ower Supply: 1.5 volts DC supplied by 2 Battery, BA-23 (1.5 volts).

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.	7CAC-596300		
PROCUREM'T INFO.:			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, C&N	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	
	- Electronics Test Equipment -		ZM-17/U

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

ELECTROMECHANICAL DESCRIPTION: (Continued)

Ohmmeter Ranges: 5/1/0.5/0.01/0.005 ohms full scale.
Accuracy: ±2% of full scale deflection.
Maximum Current: 5 amperes through unknown resistance.

MANUFACTURERS' OR CONTRACTORS' DATA:

Shallcross Manufacturing Company, Collingdale, Pennsylvania, Contract No. A 33(038)3949; Approximate Cost per Unit, $126.93, dated January 1952.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

None.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ohmmeter ZM-17/U	Metal	7CAC-596300	10	8-3/8	6-1/2	10 exclusive of batteries

OHMMETER ZM-21A/U

UNCTIONAL DESCRIPTION:

A portable general purpose constant voltage insulation resistance test set which perates from a self-contained hand generator. The equipment is designed to etermine the condition of the insulation of all types of electrical equipment having n insulation voltage rating above 500 volts, DC.

ELATIONSHIP TO OTHER EQUIPMENT:

Interchangeable with Test Set I-48-B and Ohmmeter ZM-21/U except for maintenance parts.

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The ohmmeter is a cross-coil, ratio meter including a heavy duty generator and a centrifugal voltage regulator. The meter has an external guard circuit and the indicator and generator are separately powered by permanent magnets. The meter is capable of applying full potential to the equipment under test.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.: Spec. 71-3256			
PROCUREM'T COG.: USA	DESIGN COG.: USA, SCEL		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 6. 1. 1		

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A

OHMMETER ZM-21A/U

ELECTROMECHANICAL DESCRIPTION: (Continued)
Power Supply: 500 volts, DC (supplied by self-contained generator).
Resistance Range: 0 to 1000 megohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

The Winslow Company Inc., Newark, New Jersey; Code No. 66150, Type No. 5G1000; Order No. 25722-Phila-53-34(61), 31 August 1953; Approximate Cost per Unit, $220.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Ohmmeter ZM-21A/U	Molded Phenolic		5-3/4	7-5/8	7-3/4	11
3	Cord CD-478						
1	Carrying Case	Aluminum					

MEGOHMMETER ZM-23/U

FUNCTIONAL DESCRIPTION:

Aportable, general purpose equipment used for measuring the leakage and insulation resistance of electrical machinery, transformer windings, cables, and control circuits. The instrument can also be used with an external variable voltage source to measure the voltage resistance-coeffieient. The unit is ruggedized to include field applications. Test results are indicated directly on a calibrated meter.

RELATIONSHIP TO OTHER EQUIPMENT:

ZM-23/U is the service designation for Megohmmeter, General Radio 1862-A.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The megohmmeter consists basically of a power supply, a complement of resistance standards, and an indicating meter. The power supply is stabilized against line-voltage variations and supplies a constant 500 volts

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6. 1. 1	

MEGOHMMETER ZM-23/U

ELECTROMECHANICAL DESCRIPTION: (Continued)
across the unknown resistance. The indicating meter is a balanced DC vacuum tube voltmeter with a high input resistance.

Power Supply: 115 or 230 volts, AC, 40 to 60 cycles per second, 25 watts.

Range: 0. 5 to 2, 000, 000 megohms, in 6 decade ranges.

Scale: Each resistance decade up to 500, 000 megohms utilizes 90% of the meter scale.

Center-Scale Values: 1, 10, 100, 1000, 10, 000 and 100, 000 megohms.

Accuracy: ±3% at low-resistance end of decade up to 50, 000 megohms, increasing to ±12% at the high-resistance end. There can be an additional ±2% error over the highest resistance decade.

Direct Voltage (Across Unknown): 500 volts ±2%. At resistance values below 0. 5 megohm, the applied voltage drops to limit the current to a safe value.

MANUFACTURERS' OR CONTRACTORS' DATA:
General Radio Company, Baker Avenue, West Concord, Massachusetts; Approximate Cost per Unit, $225. 00.

TUBE COMPLEMENT:
1 12AU7, 1 OB2, 1 6X4, 1 2X2-A, 1 6C4, 1 6AU6, 1 5651.

REFERENCE DATA AND LITERATURE:
Manufacturer's Catalog N.

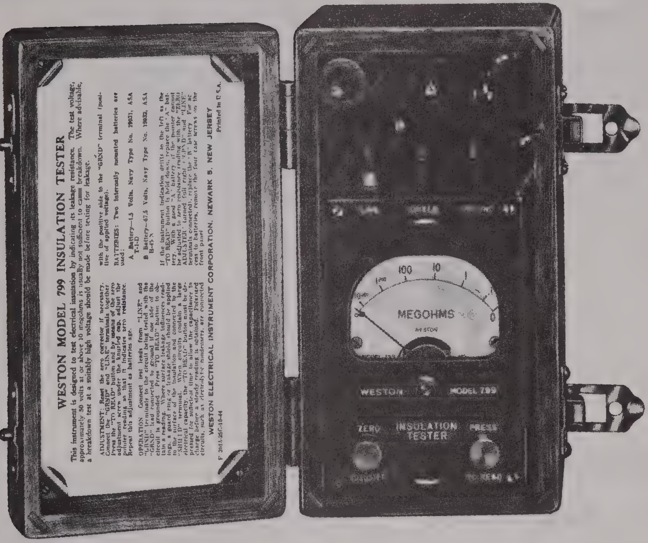
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Megohmmeter ZM-23/U	aluminum		10-1/8	9-1/8	11-3/4	15-1/2
2	Test Lead						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Megohmmeter ZM-23/U					

VACUUM TUBE MEGOHMMETER
NAVY TYPE 60089



UNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument designed to test electrical insula-on by indicating leakage resistance as well as indicating any resistance value with-n its range. The meter is calibrated in megohms. DC testing voltage of 50 volts s available at binding posts.

ELATIONSHIP TO OTHER EQUIPMENT:

Same as Weston Model 799.

LECTROMECHANICAL DESCRIPTION:

ower Supply: One 1.5 volt Battery BA-30 (filament); one 67.5 volt Battery BA-51 (plate).

ange: 0.1 to 10,000 megohms.

ccuracy: ±1/8 inch of arc at any point on the meter scale.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F17-M-30394-6251	
PROCUREM'T INFO.:	Spec. (Ships) MIL-M-15646		
PROCUREM'T COG.:	Navy	DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	
	- Electronics Test Equipment -		60089

s project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Betheada, Md. - Multilithed in U. S. A.

VACUUM TUBE MEGOHMMETER
NAVY TYPE 60089

MANUFACTURERS' OR CONTRACTORS' DATA:

Weston Electrical Instrument Company, Newark 5, New Jersey; Contract N NObsr-30147, 29 June 1945; NXsr-59072, 26 April 1944.

TUBE COMPLEMENT:

1 RETMA-1LH4.

REFERENCE DATA AND LITERATURE:

NavShips 900,744 (Instruction Book).

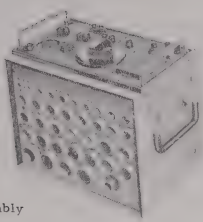
SHIPPING DATA:

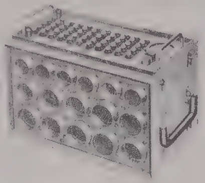
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

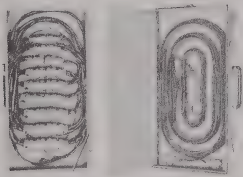
EQUIPMENT SUPPLIED:

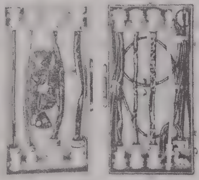
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Vacuum Tube Megohmmeter Navy Type 60089	Bakelite	F17-M-30394-6251	5-3/8	4-7/8	3-1/4	3.0
1	Carrying Case	Oak		7-1/2	6-1/2	4-5/8	2.0
3	Test Lead			48 long			0.18
1	Carrying Strap			48 long			0.14
						Total:	5.32

K-SYSTEM CABLE TESTER
(CABLE, TESTER, K-SYSTEM)
Part No. MTL-41401
(AC Spark Plug Company)


Transmitter Assembly


Receiver Assembly


Cable Adapter Box No. 1


Cable Adapter Box No. 2

FUNCTIONAL DESCRIPTION:

A portable, general purpose test set used to test the continuity of each conductor n a multiconductor cable. It provides for resistance measurement of the insulaion of each conductor, tests at 1500 volts, DC, any possible dielectric failure of he insulation of each conductor to ground and to all the other conductors in the cable being tested, provides for voice communication between the transmitter assembly and the receiving assembly.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The transmitter assembly contains a stepdown transformer and a double primary winding step-up transformer. 115 volts, AC, applied to the first primary of the step-up transformer gives a secondary potential of 1500 volts, AC. This is then rectified by a full wave bridge type rectifier. The resulting pulsating DC is then smoothed out by a filter network. (When the input voltage is 28 volts, DC, it is alternated by a vibrator before being applied to the second primary of the step-up transformer). The high potential is then directed to the

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-802409		
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.1	

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A

K-SYSTEM CABLE TESTER
(CABLE, TESTER, K-SYSTEM)
Part No. MTL-41401
(AC Spark Plug Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

particular conductor whose insulation is being checked. All other conductors
the cable are maintained at ground potential. Current leakage will light t
"Trouble" lamp by energizing a sensitive relay. The firing of this relay autom
tically de-energizes a circuit transfer relay thereby removing all voltage fro
the primary of the transformer.

When using the equipment for megger function, all external power is suppli
by an external insulation tester. The transmitter assembly then serves to rou
the voltage to the proper conductor whose insulation is to be tested.

When using the equipment for continuity testing, 115 volts, AC, is applied
the primary of the stepdown transformer to obtain 28 volts, AC, which is th
applied to a voltage dropping network. (If a 28-volt, DC, supply source is use
this is applied directly to the voltage dropping network.) The current then go
through a "Continuity" lamp on the transmitter assembly control panel and
through the conductor under test to a lamp on the receiver assembly. The lett
below each lamp corresponds to the pin designation of the conductor.

For intercom operation there is a permanent magnet speaker in both tran
mitter assembly and receiver assembly. These speakers serve as both lou
speaker and microphone. Intercom amplifier is a conventional two-stage tran
former coupled unit. A pair of sound powered handsets is also included for inte
communication.

Power Supply: 24 to 32 volts, DC, 1.04 to 1.45 amperes, 24.9 to 46.4 watts;
105 to 125 volts, AC, 60 cycles per second, single phase, 0.54 to 0.61 ampere
53.0 to 76.0 watts, 56.7 to 91.2 volt-amperes; or 105 to 125 volts, AC, 400 cycl
per second, single phase, 0.51 to 0.57 amperes, 53.0 to 72.0 watts, 53.5
72.3 volt-amperes.

MANUFACTURERS' OR CONTRACTORS' DATA:

AC Spark Plug Company, Milwaukee 2, Wisconsin; Contract No. AF 33(600)-67

TUBE COMPLEMENT:

1 JAN-26A7GT.

REFERENCE DATA AND LITERATURE:

TO 33D5-3-12-1 (Operation and Service Instructions).
TO 33D5-3-12-4 (Parts Breakdown).

SHIPPING DATA:

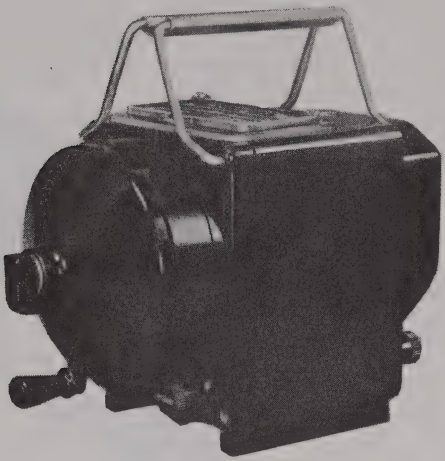
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	

K-SYSTEM CABLE TESTER
(CABLE, TESTER, K-SYSTEM)
Part No. MTL-41401
(AC Spark Plug Company)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	K-System Cable Tester		7CAC-802409				
	Including:						
1	Transmitter Assembly	Metal		14-1/2	14-3/8	11-1/2	46
1	Receiver Assembly	Metal		11-1/2	14-3/8	10-1/2	28
1	Cable Adapter Box No. 1	Metal		5-1/2	25	12	25
1	Cable Adapter Box No. 2	Metal		5-1/2	25	12	20

MEGGER INSULATION TESTER
MODEL 7679-RK
(James G. Biddle Company)



FUNCTIONAL DESCRIPTION:

A portable, self-contained, general purpose unit used to measure the insulation resistance of electrical equipment. The unit is used at manufacturing, depot, and field levels. Measurements are indicated on a calibrated ohmmeter scale.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit consists basically of a DC hand generator and an ohmmeter. The hand generator is used to provide a steady DC test voltage. A slip clutch is incorporated to assure a constant output voltage when the crank is rotated at or above "slip" speed. The ohmmeter is of the permanent-magnet, moving-coil type. The meter moving system, pivoted in spring-supported jewel bearings, carries a pointer and balance system and is free to rotate through approximately 70 degrees in the permanent-magnet field. The meter scale

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
TOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6. 1. 1	
	- Electronics Test Equipment -		Biddle 7679-RK

MEGGER INSULATION TESTER
MODEL 7679-RK
(James G. Biddle Company)

ELECTROMECHANICAL DESCRIPTION:

calibration is independent of the specific value of generator voltage within ±20% of normal. Magnets for both generator and ohmmeter are of alnico steel.

Power Supply: Operates from built-in hand generator.

Range: 0 to 10,000 ohms, 1000 megohms.

Generator Voltage: 500 volts, DC.

Accuracy: ±1% of scale length of any of the cardinal number graduations.

MANUFACTURERS' OR CONTRACTORS' DATA:

James G. Biddle Company, 1316 Arch Street, Philadelphia 7, Pennsylvania; Approximate Cost per Unit, $274.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

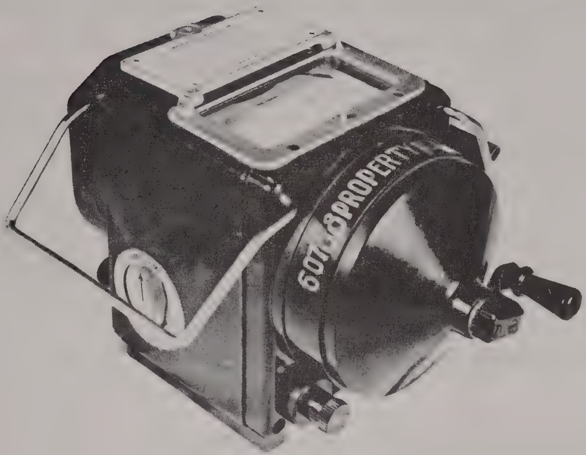
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Megger Insulation Tester Biddle 7679-RK	phenolic					13
1	Carrying Case						
1	Test Leads, Set			144 long			

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Megger Insulation Tester Biddle 7679-RK					18

MEGGER INSULATION TESTER
MODEL 9679-RK
(James G. Biddle Company)



UNCTIONAL DESCRIPTION:

Aportable, general purpose equipment used for insulation-resistance measurments on all types of electrical equipment. The instrument can be operated manally with a handcrank or electrically by a plug connection from a separate rectiier unit. The equipment is used at overhaul and repair activities and is also adptable to field use. Test results are indicated on a 3-inch calibrated meter.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The equipment consists essentially of an ohmmeter, a hand generator, and a power supply. The ohmmeter and hand generator are integral in a single unit and can be used without the power supply when a power source is not readily available. The power supply is housed separately and the hand generator is automatically disconnected when this unit is used. The power supply consists essentially of a step-up transformer and a selenium rectifier which

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.: Navy		DESIGN COG.:	Commercial
.I.I.N.:		FUNCTIONAL CLASS.	NO.: 6.1.1
	- Electronics Test Equipment -		Biddle 9679-RK

MEGGER INSULATION TESTER
MODEL 9679-RK
(James G. Biddle Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

supplies a constant DC test potential. The ohmmeter is of the permanent-mag net, cross-coil and pointer type. A guard system of electrical connections pre vents errors in the ohmmeter due to leakage inside or outside the instrumen between the positive and negative sides of the DC circuit. The power suppl unit is fused.

Power Supply: 115 volts, AC, 60 cycles per second or built-in hand generator.
Range: 0 to 1000 megohms.
Ohm Scale: 0 to 10, 000 ohms.
Accuracy: ±0. 33 of 1% of full scale.

MANUFACTURERS' OR CONTRACTORS' DATA:

James G. Biddle Company, 1316 Arch Street, Philadelphia 7, Pennsylv nia; Approximate Cost per Unit, $421. 00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Bulletin 21-46.

SHIPPING DATA:

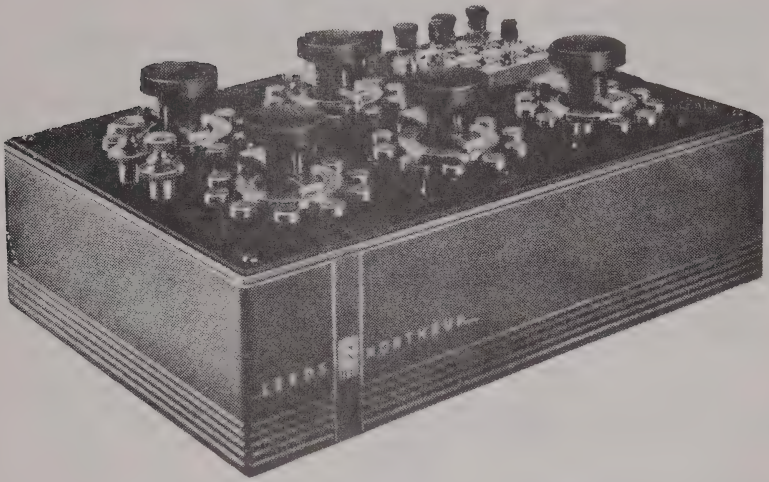
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packe (Lbs.)
			H	W	D	
	Megger Insulation Tester James G. Biddle 9679-RK					

MEGGER INSULATION TESTER
MODEL 9679-RK
(James G. Biddle Company)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Megger Insulation Tester Biddle 9679-RK			9	5	6-1/2	7-1/2
1	Power Supply			6-3/4	5-1/4	6	5-1/2
2	Test Lead			144 long			
1	Instruction Manual						

DC WHEATSTONE BRIDGE
PART No. 4725
(Leeds and Northrup Company)



UNCTIONAL DESCRIPTION:

A portable, general purpose precision instrument used for accurately measur-ng resistances. The rheostat section may be used separately as a decade resist-nce.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The ratio arms, each consisting of five resistors, are controlled by plug and block type switching. Any of the ratio resistors may be connected to either bridge arm. The rheostat is comprised of five sets of resistors which are controlled by open dial switches. Binding parts are provided for connecting auxiliary equipment.

ower Supply: 1.5, 5, 15 or 50 volts, battery.

atio Arms: Two each of 1, 10, 100, 1000, 10,000 ohms.

heostat Range: 0 to 10,000 ohms in five decades.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:	DESIGN COG.: Commercial		
F.I.I.N.: 6625-166-0397	FUNCTIONAL CLASS. NO.: 6.1.1		
	- Electronics Test Equipment - Leeds & Northrup 4725		

DC WHEATSTONE BRIDGE
PART No. 4725
(Leeds and Northrup Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Accuracy (Ratio Resistors); ±0.025%.
Accuracy (Rheostat Arms): Resistance change from zero settings of dails equals dial settings ±(0.05% +0.005 ohms).
Current Rating (Rheostat Arm used as Resistance Box): 1 ohm decade, 0.7 amp; 10 ohm decade, 0.22 amp; 100 ohm decade, 0.07 amp; 1000 ohm decade, 0.022 amp (Determined by highest decade in use).

MANUFACTURERS' OR CONTRACTORS' DATA:

Leeds and Northrup Company, 4991 Stenton Avenue, Philadelphia 44, Pennsylvania; Approximate Cost per Unit, $175.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

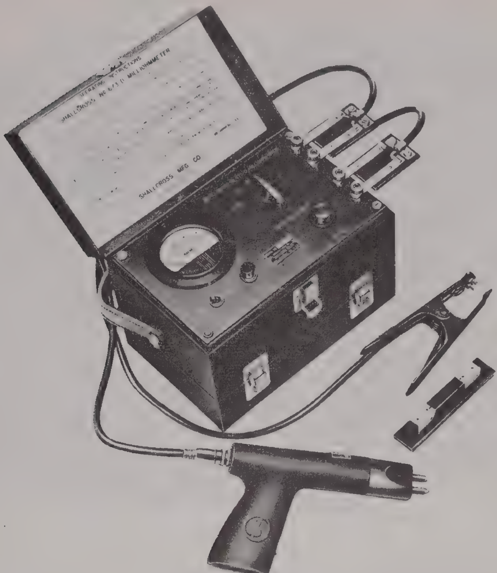
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	DC Wheatstone Bridge, Leeds and Northrup No. 4725						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	DC Wheatstone Bridge Leeds and Northrup 4725					

MILLIOHMMETER
TYPE 671
(Shallcross Manufacturing Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used to measure low resistance values. The instrument may be used to determine the resistance of welds, bonds, contacts, cables, and lamp filaments. Corrosion rate of metal surfaces may be determined by recording resistance change and plotting the change as a function of time. Test results are indicated directly on a meter calibrated in ohms.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The instrument consists of a meter, resistor circuits and a battery power supply. The test utilizes the current and potential method for the measurement of resistance. This method consists of passing a constant current through the unknown resistance and measuring the voltage drop across the resistance.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.		Standard	
TOCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.:		DESIGN COG.:	Commercial
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6. 1. 1	

MILLIOHMMETER
TYPE 671
(Shallcross Manufacturing Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: Two No. 6 batteries.
Resistance Range: 0 to 0.003 and 0 to 0.30 ohms.
Accuracy: ± 5%.

MANUFACTURERS OR CONTRACTORS' DATA:

Shallcross Manufacturing Company, Pusey and Jackson Avenue, Collingdale, Pennsylvania.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

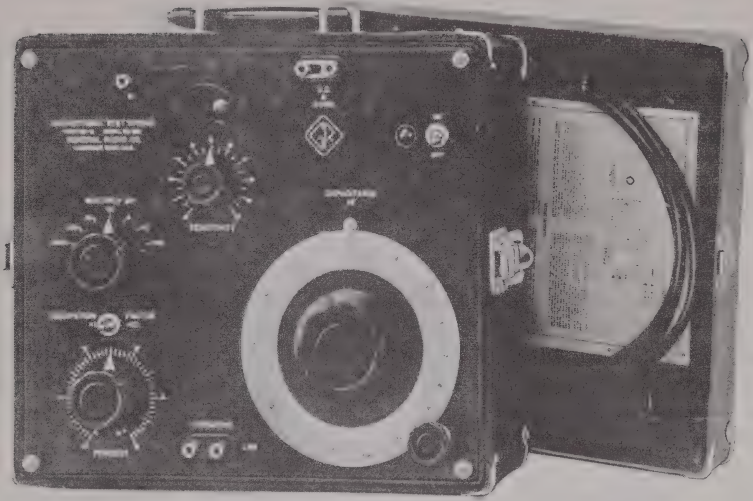
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weigh (Lbs.)
				H	W	D	
1	Milliohmmeter Shallcross 671	Metal		6-1/2	10	8-3/8	10

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packe (Lbs.)
			H	W	D	
	Milliohmmeter Shallcross 671					

CAPACITANCE TEST BRIDGE
Type 740B
(General Radio Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, bridge type test instrument designed to measure dissipation factors and capacitance values in both laboratory and production testing of capacitors. It is particularly useful in testing electrolytic capacitors since the test conditions approximate the normal operating conditions of use.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The circuit used is a standard design, series-resistance capacitance bridge. One ratio arm is variable in decade steps, and the other is continuously variable and calibrated directly in capacitance. Dissipation factor is measured by means of a dual-range variable resistor in series with the standard capacitor. The dial is calibrated to permit direct reading in dissipation factor. A visual null indicator is used consisting of a tuned amplifier and an electron-ray tube.

Power Supply: 105 to 125 volts, AC, single-phase, 60 cycles per second, 15 watts.

Capacitance Range: 5 micromicrofarads to 1100 microfarads in seven ranges.

Dissipation Factor Range: 0 to 50% in two ranges.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-136700	R16-GER-740B	
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.3	
	- Electronics Test Equipment -		Gen. Radio 740B

is project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A

CAPACITANCE TEST BRIDGE
Type 740B
(General Radio Company)

ELECTROMECHANICAL DECRIPTION: (Continued)

Accuracy:

Capacitance: ±1% over the main decade (1 to 11) of the capacitance dial for all multiplier settings except 0.0001. Within ±1.5% or ±3 micromicrofarads, whichever is the larger, on the 0.0001 multiplier setting. Below 100 micromicrofarads the error gradually increases to ±5 micromicrofarads as zero is approached.

Dissipation Factor: ±1.5% of full scale reading for all multipliers except 0.0001, where a correction of 0.3% should be subtracted from the dial reading. With this correction, the calibration is within ±2 divisions on the X1 multiplier and within ±1 division on the X10 multiplier.

Voltages to Unknown: Varies continuously with bridge setting from 35 volts for very small capacitances down to approximately one-volt at 100 microfarads.

Polarizing Voltage: Terminals provided for connecting a DC polarizing voltage.

Controls: Capacitance dial and multiplier, dissipation factor control and multiplier, sensitivity control.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Massachusetts; Approximate Cost per Unit, $192.50.

TUBE COMPLEMENT:

1 JAN-6X5GT/G, 1 JAN-6J7, 1 JAN-6E5.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog M, 1951.

Manufacturer's Operating and Maintenance Instructions.

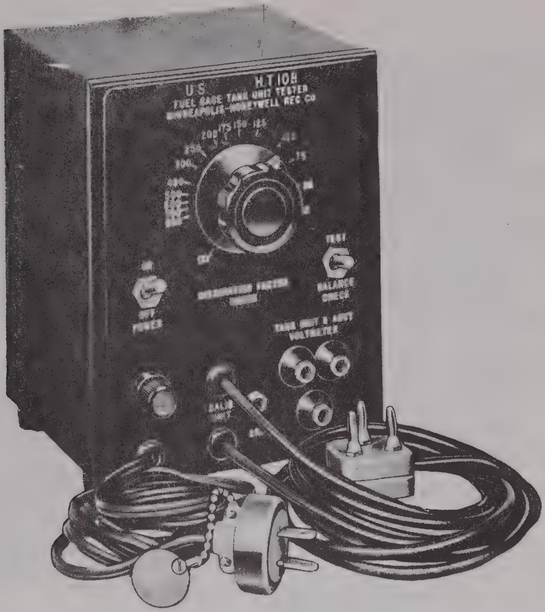
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1 case	Capacitance Test Bridge Gen. Radio Type 740B (E. P.)	5.3	19	21	23	55
1 c't'n	Capacitance Test Bridge Gen. Radio Type 740B (D. P.)	2.5	15	16-1/2	18-1/2	26

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Capacitance Test Bridge Gen.Radio Type 740B	Wood, fabric covered	7CAC-136700 R16-GER-740B	9-1/4	14-1/2	15	19

TESTER, FUEL GAGE TANK UNIT
PART No. HT 108
(Minneapolis-Honeywell Regulator Company)


U.S. H.T.108
FUEL GAGE TANK UNIT TESTER
MINNEAPOLIS-HONEYWELL REG. Co
TEST
BALANCE CHECK
DISSIPATION FACTOR
POWER
TANK UNIT & ADJ. VOLTMETER

FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment designed to test the dissipation factor and capacitance of tank units, compensators and substitute capacitance units. Dissipation factor is read directly from a calibrated dial located on the front panel of the tester. Capacitance of the unit under test is read directly from a calibrated dial on an associated test equipment.

RELATIONSHIP TO OTHER EQUIPMENT:

The HT 108 is used in conjunction with Variable Capacitance Field Tester Minneapolis-Honeywell HT 109, Electronic Mulitmeter ME-6D/U, and connecting cable assemblies.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The tester is comprised of a bridge transformer, a voltage equalizing potentiometer, a dissipation factor check resistor, a test switch,

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
TOCK NOS.	7800-811670	R88T0942-000-000(ASO)	
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
I.I.N.: 4920-696-7200		FUNCTIONAL CLASS. NO.: 6.1.3	
	- Electronics Test Equipment - M-Honeywell HT 108		

TESTER, FUEL GAGE TANK UNIT
PART No. HT 108
(Minneapolis-Honeywell Regulator Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

and a fuse mounted upon a chassis. When used in conjunction with associated test equipment the test set completes a capacitance bridge circuit.

Power Supply: 115 volts, AC, 400 cycles per second, single-phase.
Dissipation Factor Range: 0 to infinity.
Capacitance Measurement Range: 30 to 100 micromicrofarads.

MANUFACTURERS' OR CONTRACTORS' DATA:

Minneapolis-Honeywell Regulator Company, Aeronautical Division, 2600 Ridgeway Road, Minneapolis 13, Minnesota; Contract No. N383s 95817(P); Approximate Cost per Unit, $556.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

T. O. 17-15c-12 Handbook of Operation and Service Instructions.

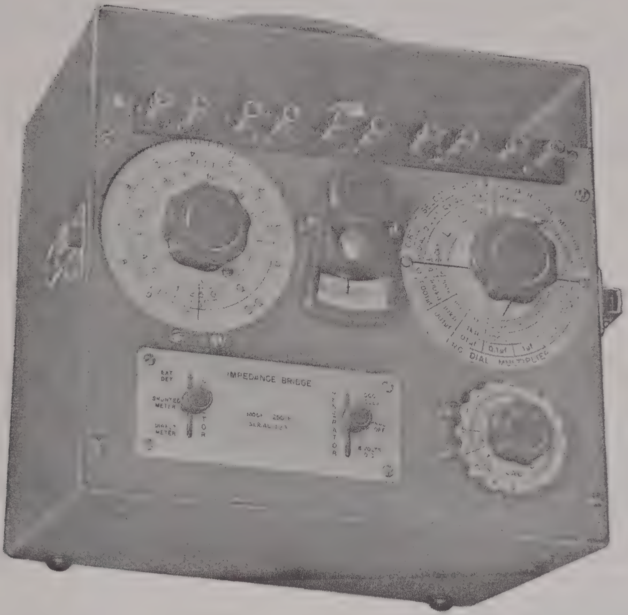
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Tester, Fuel Gage Tank Unit Minneapolis-Honeywell HT 108	Metal	7800-811670 (USAF) R88T0942-000-000 (Navy)				

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Tester, Fuel Gage Tank Unit Minneapolis-Honeywell HT 108					

IMPEDANCE BRIDGE TS-460C/U
(BRIDGE, IMPEDANCE, TS-460C/U)



UNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained bridge type test instrument designed rimarily for use in electrical and electronic work where the values of resistors, ductors and capacitors must be measured accurately. It will measure the induc- nce and storage factor of coils, the capacitance and dissipation factor of capacitors nd the AC and DC resistance on all types of resistors. The bridge has a built in kilocycle per second signal source and a DC bridge source. Results are read di- ectly from dials having approximately logarithmic scales. A zero center galva- ometer is used for indicating bridge balance with the use of the DC source. Head- ones are used for indication of balance with an AC signal source. Provision is ade for hookup to an external signal generator for extending the frequency range.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to Brown Electro-Measurement Corporation Model 250-B Universal Im- dance Bridge.

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Standard		
TOCK NOS.	7CAC-137525	R16-T-1875-20	3F2008C
ROCUREM'T INFO.:			
ROCUREM'T COG.: Army		DESIGN COG.: Army, CSL	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.4	
	- Electronics Test Equipment -		TS-460C/U

roject was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

IMPEDANCE BRIDGE TS-460C/U
(BRIDGE, IMPEDANCE, TS-460C/U)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The impedance bridge is a four arm bridge of standard design housed in an internally shielded cabinet which includes a battery compartment.

Power Supply: 6 volts DC from four 1.5 volt Batteries BA-30.

Frequency Range: From a few cycles per second to 10 kilocycles per second using an external signal generator.

Internal Signal Source: 1.0 kilocycles per second.

Ranges:
- Resistance: 1 milliohm to 11 megohms.
- Capacitance: 1 micromicrofarad to 1100 microfarads.
- Inductance: 1 microhenry to 1100 henrys.
- Dissipation Factor: 0.001 to 1.05.
- Storage Factor: 0.02 to 1000.

Accuracy:
- Internal Signal Source: ±5%.
- Resistance:
  - 0.1 ohm range: ±(0.35% + 1 division on inner LRC dial).
  - 1 megohm and 11 megohm ranges: ±(0.2% + 1 division on inner LRC dial).
  - All other Ranges: ±(0.15% + 1 division on inner LRC dial).
- Capacitance:
  - 100 micromicrofarads to 100 microfarads: ±(0.5% + 1 division on inner LRC dial).
  - Over 100 microfarads: ±2%.
  - Less than 100 micromicrofarads: ±2 micromicrofarads (when corrected for bridge and lead capacitance).
- Inductance:
  - 100 microhenry to 10 henrys: ±(1.0% + 1 division on inner LRC dial).
  - Over 10 henrys: ±10%.
  - Less than 100 microhenrys: ±2 microhenrys (when corrected for bridge and lead inductance).
- Dissipation Factor:
  - Capacitors greater than 0.1 microfarad: ±(7% + 0.0025).
- Storage Factor:
  - Up to 10 henrys: ±(7% + 0.0025).
  - At 100 henrys: ±(7% + 0.015) in terms of its reciprocal.
  - At 1000 henrys: ±(7% + 0.055).

MANUFACTURERS' OR CONTRACTORS' DATA:

Brown Electro-Measurement Corporation, 4635-37 S. E., Hawthorne Boulevard, Portland 15, Oregon; Approximate Cost per Unit, $240.00.

TUBE COMPLEMENT:

None.

IMPEDANCE BRIDGE TS-460C/U
(BRIDGE, IMPEDANCE, TS-460C/U)

REFERENCE DATA AND LITERATURE:

TO 16-35TS460-5 (TM 11-5042) (Instruction Book).

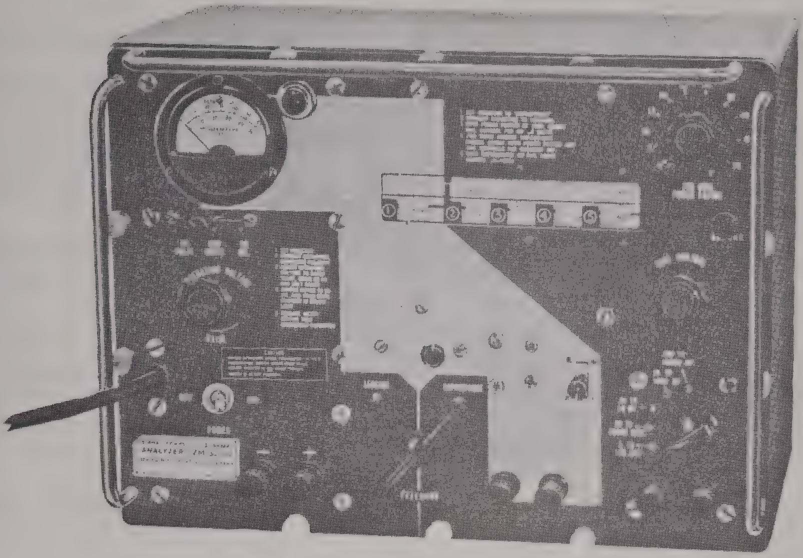
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Impedance Bridge TS-460C/U and accessories	1. 13	11-1/2	12-1/2	13-1/2	20

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Impedance Bridge TS-460C/U	Alum-inum	7CAC-137525 R16-T-1875-20 3F2008C	8-3/4	10-1/2	10-1/2	15
2	Test Lead			19-1/2 long			
2	Instruction Book TM 11-2646						

ANALYZER ZM-3/U
(TEST SET, CAPACITOR, ZM-3/U)



UNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument designed to determine the essential haracteristics of capacitors. It will measure leakage current of electrolytic ca- acitors, insulation resistance and power factor of all other types of capacitors, and apacitance of all types. A single meter is used as a voltmeter and milliammeter r leakage measurements and as a bridge balance indicator, with a DC amplifier, r insulation resistance and capacitance measurements. The meter is calibrated volts DC and milliamperes DC. The analyzer may also be used to check insula- on and capacitance on cables.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The components and circuits used in more than one function are connected by the ganged selector switch. The Insulation Resistance function

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-801319-499		3F3936-3
PROCUREM'T INFO.:	Sig. C. Spec. No. 71-3388		
PROCUREM'T COG.:	Army	DESIGN COG.:	Army, CSL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	6.1.4
	- Electronics Test Equipment -		ZM-3/U

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

ANALYZER ZM-3/U
(TEST SET, CAPACITOR, ZM-3/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)
uses a full wave rectifier, a low voltage power supply, a calibrated resistor an drum dial, and a DC amplifier which operates the meter (D'Arsonval movement) The Capacitance function uses a full wave rectifier in the low-voltage power supply, an oscillator, a bridge circuit incorporating the calibrated variable resisto and the drum dial, and an amplifier and rectifier feeding the DC amplifier whic operates the meter. The Leakage Current function uses a half-wave rectifier i a variable power supply and the meter with its associated shunt and multipliers

Power Supply: 115 volts ±10 volts, AC or 230 volts ±20 volts, AC, 50 to 1600 cycle per second, single phase.

Measuring Frequency: 1000 cycles per second (5 micromicrofarads to 100 microfarads), and 100 cycles per second (100 microfarads to 10, 000 microfarads).

Leakage Voltage Range: 0 to 60 volts DC, 0 to 600 volts DC.

Leakage Current Range: 0 to 50 milliamperes DC.

Insulation Resistance Range: 1.1 to 100 megohms, 110 to 10, 000 megohms.

Capacitance Ranges: 5 to 100 micromicrofarads; 80 to 50,000 micromicrofarads 0.04 to 30 microfarads; 25 to 1000 microfarads; 250 to 10, 000 microfarads.

Power Factor Range: 0 to 50% on capacitors 0.05 microfarad or larger.

Accuracy:

Direct Voltage and Current Measurements: ±3% of full-scale meter deflection.

Insulation Resistance: ±20%.

Capacitance:

5 micromicrofarads to 100 micromicrofarads	±3 micromicrofarads
100 micromicrofarads to 100 microfarads	±5%
100 microfarads to 1000 microfarads	±10%
1000 microfarads to 10, 000 microfarads	±20%

Power Factor: ±10%.

MANUFACTURERS' OR CONTRACTORS' DATA:
Shallcross Manufacturing Company, 10 Jackson Avenue, Collingdale, Pennsylvania; Order No. 25455-PH-49.

TUBE COMPLEMENT:
1 JAN-12AU7, 1 JAN-6C4, 1 JAN-6BA6, 1 JAN-6X4, 1 JAN-OA2, 2 JAN-OB2 1 JAN-6SL7, 1 JAN-807.

REFERENCE DATA AND LITERATURE:
TO 16-35ZM3-5 (TM 11-5043) (Instruction Book).

SHIPPING DATA:

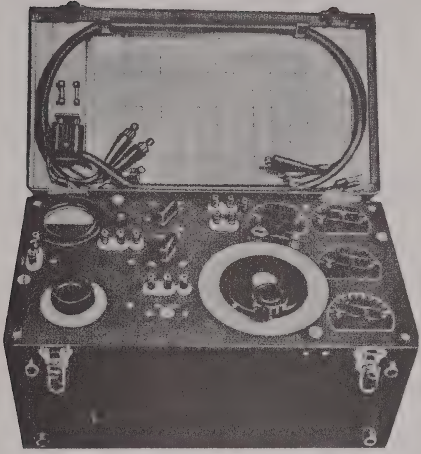
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Analyzer ZM-3/U	3.2	16	20	23	81

ANALYZER ZM-3/U
(TEST SET, CAPACITOR, ZM-3/U)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Analyzer ZM-3/U	Aluminum	7CAC-801319-499 3F3936-3	10-3/8	13-7/8	8-5/8	34.75
1	Transit Case			14-3/8	17-5/8	12-1/2	15.25
2	Set Spare Tubes						

IMPEDANCE BRIDGE ZM-6/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose unit used to measure impedance in terms of reactance and resistance. Test results are obtained by means of a meter located on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

An RF signal generator with a frequency range of 200 to 550 kilocycles per second is required but not supplied.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set measures the impedance by the substitution method in a series resonant circuit.

Power Supply: None.

Frequency Range: 200 to 550 kilocycles per second.

Impedance: 0 to 300 ohms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-B-86688-2251	

PROCUREM'T INFO.:

PROCUREM'T COG.: DESIGN COG.: Navy

F.I.I.N.: FUNCTIONAL CLASS. NO.: 6. 1. 4

IMPEDANCE BRIDGE ZM-6/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Capacity: 0 to 900 micromicrofarads.
Inductance: Dependent on the frequency range of the signal generator.
Resistance: 0 to 211 ohms.
Milliammeter: 0 to115 milliampere, thermo-galvanometer type.

MANUFACTURERS' OR CONTRACTERS' DATA:

Pioneer Electric and Reasearch Corporation, Forest Park, Illinois; Contrac No. CCA-25741.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Catalog of Navy Material. NAVSHIPS 91087 (Instruction Book).

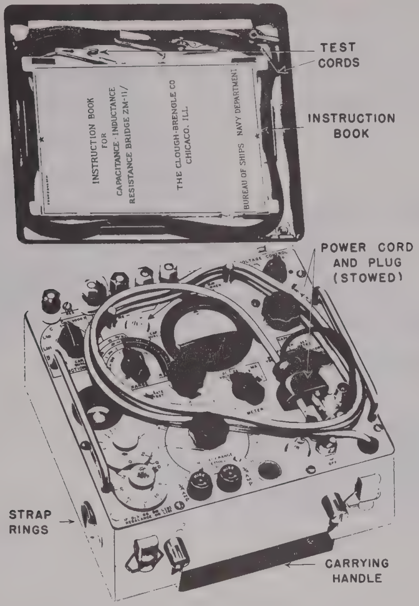
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Impedance Bridge ZM-6/U		F16-B-86688-2251 (USN)				

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Impedance Bridge ZM-6/U					

CAPACITANCE-INDUCTANCE-RESISTANCE BRIDGE ZM-11/U
(BRIDGE, CAPACITANCE, INDUCTANCE, RESISTANCE, ZM-11/U)


TEST CORDS
INSTRUCTION BOOK
INSTRUCTION BOOK FOR CAPACITANCE-INDUCTANCE RESISTANCE BRIDGE ZM-11/
THE CLOUGH-BRENGLE CO CHICAGO, ILL
BUREAU OF SHIPS NAVY DEPARTMENT
POWER CORD AND PLUG (STOWED)
STRAP RINGS
CARRYING HANDLE

FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used for measuring and checking capacitors, resistors, inductors, and transformers to determine their properties and condition. It is useful in the servicing and maintenance of practically all components used in electronic equipment in the field.

RELATIONSHIP TO OTHER EQUIPMENT:

Supersedes Navy Type 60007 capacitance and resistance bridge. It has a greater range and includes inductance measurement. It is also smaller and more compact in design.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 105 to 125 volts, AC, 60 cycles per second, single phase, 35 watts.
Frequency Range: 1000 cycles per second ±10%, or DC, both generated internally.
Resistance Range: 1 ohm to 11 megohms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-Q-358011-200	
PROCUREM'T INFO.: Spec.MIL-B-15421(Ships) dtd. 15 Oct '50, Navy Spec.16B20(RE)			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.4	
	- Electronics Test Equipment -		ZM-11/U

s project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

CAPACITANCE-INDUCTANCE-RESISTANCE BRIDGE ZM-11/U
(BRIDGE, CAPACITANCE, INDUCTANCE, RESISTANCE, ZM-11/U)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Capacitance Range: 10 micromicrofarads to 110 microfarads.

Inductance Range: 100 microhenries to 110 henries.

Capacitance Dissipation Factor (1/Q): 0 to 0.06, 10 micromicrofarads to 0.1 microfarads; 0 to 0.6, 0.1 microfarad to 100 microfarads.

Turns Ratio Range: 0.01 to 0.11, 0.1 to 1.1, 1 to 11.1, 10.0 to 110.

Q Range: 0.5 to 20.

Accuracies:

Resistance: ±(1.5% + 0.03 ohms), 1 ohm to 1 megohm; ±5%, 1 to 10 megohms.

Capacitance: ±1.5%, 10 micromicrofarads to 0.5 microfarads and up to ±2.5% at 22 microfarads for paper condensers, up to ±25% at 2 microfarads and ±12% at 22 microfards for electrolytic condensers; ±15% overall including electrolytic condensers above 22 microfarads.

Inductance: ±2.5%, 0.5 millihenry to 5 henries; ±5%, 5 to 100 henries.

MANUFACTURERS' OR CONTRACTORS' DATA:

Clough-Brengle Company, Chicago, Illinois; Navy Contracts Nos. NObsr-43157, NObsr-49270, NObsr-52462, NObsr-59239.

TUBE COMPLEMENT:

1 JAN-6E5, 1 JAN-6J6, 2 JAN-6AV6, 1 JAN-6AG5, 1 JAN-6AL5W, 1 JAN-6AQ5, 1 JAN-6X4W.

REFERENCE DATA AND LITERATURE:

Manufacturer's Instruction Book.

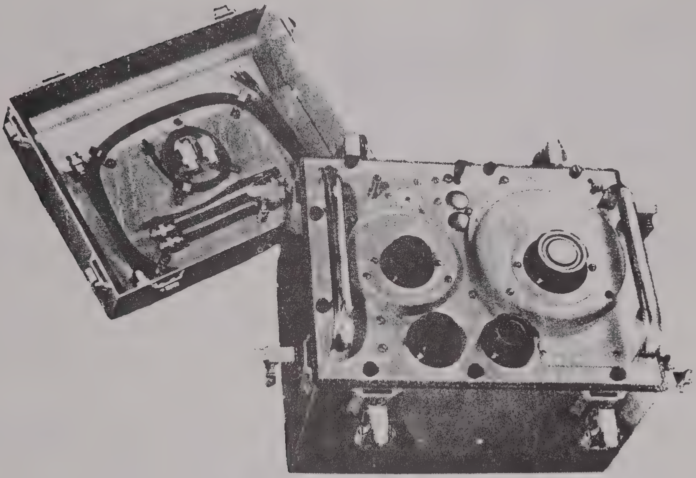
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Capacitance-Resistance-Inductance-Bridge, ZM-11/U	Metal	F16-Q-358011-200	7-7/8	8-3/8	6-7/8	11.5
2	Test Lead			36 long			
1	Case of Unit LC			7-1/8	7-1/4	6-1/4	
1	Instruction Book						

IMPEDANCE BRIDGE AN/URM-39



UNCTIONAL DESCRIPTION:

A portable general purpose null instrument designed to measure impedance at equencies from 400 kilocycles per second to 60 megacycles per second. A series-ubstitution method is employed for measuring an unknown impedance in terms of s series resistance and reaction components. An RF frequency generator and a ielded radio receiver, not supplied, are necessary for making impedance meas-ements.

ELATIONSHIP TO TOHER EQUIPMENT:

Similar to TS-582/U in function but differs in circuitry and physical appearance. N/URM-39 is a militarized version of General Radio type 1606-A.

LECTROMECHANICAL DESCRIPTION:

rcuit Information: Conventional circuitry is used for series-substitution type of measurement. A single input transformer is used over the entire frequency range. All elements are well shielded. The grounded equipment case serves as

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			
ROCUREM'T INFO.: Spec. MIL-B-16109 (SHIPS)			
ROCUREM'T COG.: USN		DESIGN COG.: USN, BuShips	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.5	
	- Electronics Test Equipment -		AN/URM-39

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

IMPEDANCE BRIDGE AN/URM-39

ELECTROMECHANICAL DESCRIPTION: (Continued)
one terminal for connection of the unknown element, making shielding somewhat more effective than otherwise.
Power Supply: None.
Frequency Range: 400 kilocycles per second to 60 megacycles per second.
Resistance Measuring Range: 0 to 1000 ohms, read directly.
Reactance Measuring Range: 0 to ±5000 ohms at 1 megacycle per second (read directly at 1 megacycle per second; varies inversely with frequency).
Minimum RF Input: 0.1 volt.
Input Impedance: 50 ohms.
Resistance Measuring Accuracy: ±1% +0.1 ohm.
Reactance Measuring Accuracy: ±(2% +1 ohm +0.0008 x resistance x frequency in megacycles per second).

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Massachusetts; Contract No. NObsr 52620, dated 21 June 1951; NObsr 64213, dated 27 May 1954; GR Part No. P-1606; Approximate Cost per Unit, $550.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 92123 (Instruction Book).

SHIPPING DATA:

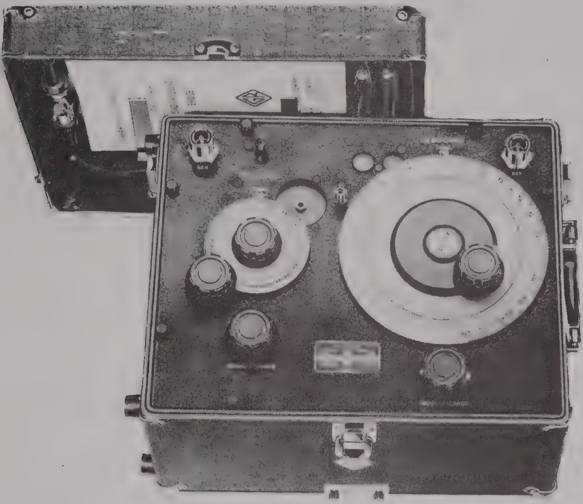
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Impedance Bridge AN/URM-39	5.3	21	23	19	75

IMPEDANCE BRIDGE AN/URM-39

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Impedance Bridge AN/URM-39	Metal		10-1/4	12-1/2	9-1/2	23
1	Impedance Bridge ZM-27/URM-39						
1	Combination Case			12-1/4	14-1/8	11-1/4	
2	Cable Assembly CG-409A/U			48 long			
2	Cable Assembly CG-409A/U			6 long			
1	Test Lead CX-3261/U			29 long			
1	Test Lead CX-3261/U			7 long			
1	Cable Assembly CG-1335/U			48 long			
						Total:	29

IMPEDANCE BRIDGE TS-582/U



UNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument designed for impedance measurenents at radio frequencies. When used with an RF signal generator and a suitable etector, it can be used to measure directly the reactance and resistance of antennas, ransmission lines, and circuit elements. The use of an external parallel capacitor nakes it possible to measure parallel tuned circuits, high resistances and other igh impedances. Two dials, "Resistance" and "Reactance", are calibrated in hms. Resistance is direct reading independent of frequency. Reactance is direct eading at a single frequency (1 megacycle per second); reactance at other frequencies s determined by dividing the dial reading by the operating frequency.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to General Radio Type 916A Radio Frequency Bridge and to Navy Type 0094 Radio Frequency Bridge.

An RF signal generator and a detector are required but not supplied.

Superseded by Impedance Bridge AN/URM-39.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-B-86074-1801	3F2009
PROCUREM'T INFO.: Navy Spec. RE13A969A			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.5	
- Electronics Test Equipment -			TS-582/U

s project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

IMPEDANCE BRIDGE TS-582/U

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Measurements are made by a series-substitution method. The components of the unknown impedance are determined from the change in settings of the two capacitors. In making measurements the bridge is first balanced by means of the two capacitors with a short circuit across the unknown terminals. The short is then removed, the unknown impedance connected, and the bridge rebalanced.

Power Supply: None required.

Frequency Range: 400 kilocycles per second to 60 megacycles per second.

Reactance Range: 0 to 5000 ohms at 1 megacycle per second. This range varies inversely as the frequency, and at other frequencies the dial reading must be divided by the frequency in megacycles per second.

Resistance Range: 0 to 1000 ohms.

Input Signal Required: 1.0 to 10 volts.

Detector Sensitivity Required: 1.0 to 10 microvolts.

Accuracies:

Reactance, at frequencies up to 50 megacycles per second:

±(2% + 1 ohm +0.0008 x R x f), where R is the measured resistance in ohms and f is the frequency in megacycles per second.

Resistance, at frequencies up to 50 megacycles per second:

±(1% + 0.1 ohm) subject to correction for residual parameters. At high frequencies the correction depends on the frequency and on the magnitude of the unknown resistance component. At low frequencies the correction depends on the frequency and on the magnitude of the unknown reactance component. Plots of these corrections are given in the instruction book supplied with the bridge.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, Cambridge 39, Massachusetts; Navy Contract NXs-62333; Approximate Cost per Unit, $475.00, October 1951.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-45-152 (Operating and Maintenance Instructions).

SHIPPING DATA:

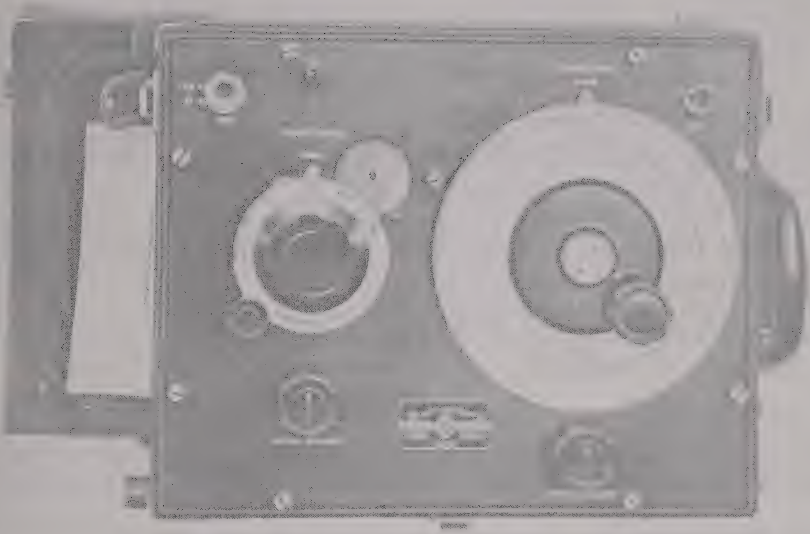
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

IMPEDANCE BRIDGE TS-582/U

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Impedance Bridge TS-582/U		F16-B-86704-1801 3F2009	13-1/2	17	11-1/8	34.5
1	Test Lead		3E4139-2.5	6-1/2 long			
1	Test Lead		3E4139-24.1	36 long			
2	Coaxial Cable						
2	RF Transformer						
2	Instruction Book TO 16-45-152						

RF BRIDGE
NAVY TYPE 60094



UNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument designed for impedance measure-
nents at radio frequencies. When used with an RF signal generator and a suitable
etector, it can be used to measure directly the reactance and resistance of antennas,
ransmission lines, and circuit elements. The use of an external parallel capacitor
nakes it possible to measure parallel tuned circuits, high resistances and other
igh impedances. Two dials, "Resistance" and "Reactance", are calibrated in ohms.
esistance is direct reading independent of frequency. Reactance is direct reading
t a single frequency (1 megacycle per second); reactance at other frequencies is
etermined by dividing the dial reading by the operating frequency.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to General Radio Type 916A Radio-Frequency Bridge.

LECTROMECHANICAL DESCRIPTION:

ircuit Information: Measurements are made by a series-substitution method. The

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.		F16-B-86074-1801	3F2009
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.5	
	- Electronics Test Equipment -		60094

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

RF BRIDGE
NAVY TYPE 60094

ELECTROMECHANICAL DESCRIPTION: (Continued)

components of the unknown impedance are determined from the change in settin of the two capacitors. In making measurements the bridge is first balanced means of the two capacitors with a short circuit across the unknown terminal The short is then removed, the unknown impedance connected, and the bridge r balanced.

Power Supply: None.

Frequency Range: 400 kilocycles per second to 60 megacycles per second.

Resistance Range: 0 to 1000 ohms.

Reactance Range: 0 to 5000 ohms at 1 megacycle per second. This range vari inversely as the frequency, and at other frequencies the dial reading must divided by the frequency in megacycles per second.

Input Signal Required: 1.0 to 10 volts.

Detector Sensitivity Required: 1.0 to 10 microvolts.

Accuracies: Resistance: ±(1% + 0.1 ohm). Reactance: ±(2% + 1 ohm).

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, 275 Massachusetts Avenue, Cambridge 39, Massach setts; Contract No. NXS62333; Approximate Cost per Unit, $475.00, October, 195

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

NavShips 95437 (Operating Instructions).

SHIPPING DATA:

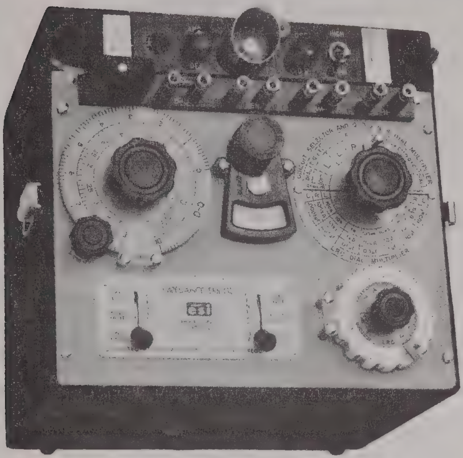
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	

RF BRIDGE
NAVY TYPE 60094

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	RF Bridge NT60094		F16-B-86074-1801 3F2009	13-1/2	17	11-1/8	34.5
1	Test Lead		3E4139-2.5	6-1/2 long			
1	Test Lead		3E4139-24.1	36 long			
2	Coaxial Cable						
2	RF Transformer						

IMPEDANCE BRIDGE
MODEL 250 DA
(Electro-Measurements, Incorporated)



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument used for DC and audio frequency measurements of resistance, inductance, capacitance, and dissipation factor (D), and storage factor (Q).

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit consists essentially of a sensitive galvanometer, a vacuum tube AC generator, a high gain amplifier with an electron-ray tube, a visual null indicator, and a line operated power supply. The L-R-C decade assembly is comprised of two coaxially mounted precision resistance decades in combination with an interpolating rheostat. The outer decade dial permits rapid scanning of the impedance range and the inner dial provides a vernier adjustment. The resulting reading is presented in decimal form in a single horizontal line.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.5	
		- Electronics Test Equipment -E-Measurements 250 DA	

IMPEDANCE BRIDGE
MODEL 250 DA
(Electro-Measurements, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts, AC, 60 cycles per second.
Operating Frequency: 1.0 kilocycle per second.
Amplifier-Oscillator Gain: Approximately 65 decibels.
Second Harmonic Rejection: Approximately 20 decibels.
Resistance:
  Range: 0 to 12 megohms in 8 ranges (0.1 milliohm increments).
Accuracy: ±0.1% plus 1 dial division.
Capacitance:
  Range: 0 to 1200 microfarads in 7 ranges (0.1 micromicrofarad increments
Accuracy: ±0.25% plus 1 dial division.
Inductance:
  Range: 0 to 1200 henrys in 7 ranges (0.1 microhenry increments).
Accuracy: ±0.9% plus 1 dial division.

MANUFACTURERS' OR CONTRACTORS' DATA:

Electro-Measurements, Incorporated, 7524 South West Macadarn, Portland
Oregon; Approximate Cost per Unit, $495.00.

TUBE COMPLEMENT:

1 12AT7, 1 12AX7, 1 6U5.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog A-26.

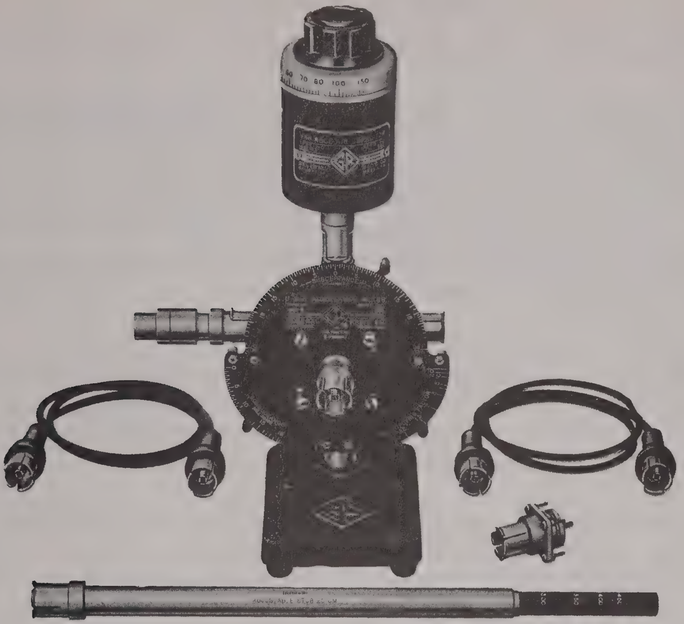
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weigh (Lbs.
				H	W	D	
1	Impedance Bridge Model 250 DA			9	10-1/2	11	17-1/

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	
	Impedance Bridge Electro-Measurements 250DA					
E-Measurements 250 DA - Electronic Test Equipment -						

ADMITTANCE METER
TYPE 1602-B
(General Radio Company)



UNCTIONAL DESCRIPTION:

A portable, general purpose instrument used to determine the components of an unknown admittance in the very high and ultra high frequency ranges. The test set may be used for measurements on coaxial systems. It may also be used as an indicator for adjusting a network to a predetermined admittance or for matching one etwork against another. The instrument is particularly useful in matching anennas and other networks to 50 ohm circuits.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit is essentially comprised of a coaxial line to which the unknown admitance is connected, a sheilded pickup loop to sample the current, a second line and pickup loop terminated in a pure resistance and a third line and pickup loop terminated in a pure reactance. All lines are fed from a common voltage source, so that the input voltages are in phase and the current

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.		Standard	
TOCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.:		DESIGN COG.:	Commercial
.I.L.N.: 6625-511-0512		FUNCTIONAL CLASS. NO.:	6. 1. 6
	- Electronics Test Equipment -		General Radio 1602-B

ADMITTANCE METER
TYPE 1602-B
(General Radio Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

in each line is proportional to the admittance. The voltage induced in each loo is proportional to the current in the corresponding line and is dependent upo the orientation of the loop, which is adjustable. The three loops are connecte in parallel, and the voltage from the loop in the unknown line is canceled by ad justing the loops coupled to the standard line until a null is reached. The con ductance or susceptance is read directly from the scales of the standard loop and the multiplying factor is read from the scale of the loop in the unknown line

Power Supply: None.

Frequency Range: 20 to 1500 megacycles per second.

Conductance Range: 100 micromhos to 1000 millimhos with multiplying factor from 1 to 20, factors from 20 to 100 may be approximated.

Susceptance Range: -20 to +20 millimhos with multiplying factor from 1 to 20 factors from 20 to 100 may be approximated.

Accuracies:

To 1000 megacycles per second: 0 to 20 millimhos, ±(3% + 0. 2 millimho); to infinity millimhos, ±(3$\sqrt{M}$% + 0. 2 millimho).

Above 1000 megacycles per second: Basic figure of 3% becomes 5% at 150 megacycles per second.

Matching Impedances: ±3% for 50 ohms up to 1500 megacycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, Baker Avenue, West Concord, Massachusetts; Approx imate Cost per Unit, $295. 00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog "P".

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weig Pack (Lbs.
			H	W	D	
	Admittance Meter General Radio 1602-B					

ADMITTANCE METER
TYPE 1602-B
(General Radio Company)

QUIPMENT SUPPLIED:

uant. Per q'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Type 1602-B UHF Admittance Meter			7-1/2	5-1/2	5-1/2	8-1/4
1	Type 1602-P450 ohm Termination						
1	Type 1602-P1 Variable Air Capacitor						
1	Type 1602-P3 Variable Air Capacitor						
2	Type 874-R22 Patch Cords						
1	Type 874-PB58 Panel Connector						

PHASE MONITOR ME-63/U

UNCTIONAL DESCRIPTION:

A portable, general purpose, low frequency device, which provides for com-lete measurement and recording, in degrees, of phase differences between two inusoidal or non-sinusoidal voltages in its frequency range.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to Technology Instrument Corporation Type 322-A Precision Phase eter.

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The circuitry consists of a limiter a phase inverter, a pulse-forming circuit, a discriminator circuit, and a built-in meter for direct reading of phase differences.

ower Supply: 115 volts, ±10%, AC, 50 to 60 cycles per second, single phase, approximately 250 watts.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			
ROCUREM'T INFO.:	USAF Exhibit ENG-1269		
ROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, Rome
.I.I.N.:		FUNCTIONAL CLASS. NO.:	6.1.8
	- Electronics Test Equipment -		ME-63/U

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

PHASE MONITOR ME-63/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Range: 20 to 20,000 cycles per second.
Input Voltage Range: 2 to 30 volts peak (1.4 to 21.2 volts rms).
Input Impedance: 4.7 megohms in shunt with 13 micromicrofarads.
Meter Ranges: 0° to 360° and 0° to 30°; the latter is capable of reading an increment of 30° at any point in the 360° range.
Phase Angle Range: 0° to 360° without ambiguity.
Phase Angle Reading Accuracy: For Directly and Indirectly Read Angles: ±1°. Angles of non-sines which lie between 330° and 360° or 0° and 30°: ±2°.

MANUFACTURERS' OR CONTRACTORS' DATA:

Technology Instrument Corporation, Acton, Massachusetts; USAF Development Contract AF 28(099)234 dated 15 May 1950; Approximate Cost per Unit, $1420.00.

TUBE COMPLEMENT:

2 JAN-6J6, 8 JAN-6J6W, 3 JAN-6AQ5, 2 JAN-6AL5, 1 JAN-6BL7, 3 JAN-6AS7, 2 JAN-6AU6, 2 JAN-0A2, 1 JAN-0B2.

REFERENCE DATA AND LITERATURE:

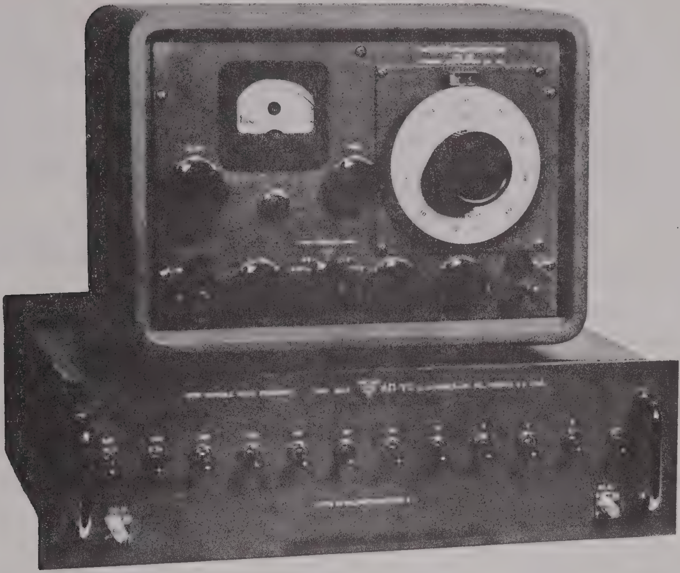
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Phase Monitor ME-63/U (Domestic Packed)	5	18	20	24	100

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Phase Monitor ME-63/U			14-1/2	16-1/2	19-1/2	85

PHASE DETECTOR
TYPE 205A1
(AD-YU Electronics Laboratory, Incorporated)



UNCTIONAL DESCRIPTION:

A portable, general purpose instrument designed to detect and measure the hase angle or time delay in amplifiers, pulse circuits, and transmission networks. he unit may be used to determine the phase angle between two continuous sine aves, two coincident pulse-modulated sine waves, or between one continuous and ne pulsed sine wave.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The instrument consists basically of two input channels. One channel (E_2) consists of a cathode follower input, a step delay line, amplifier and a continuously variable delay line. The other channel (E_1) consists of an amplifier, a differential tuned amplifier, a balanced phase detector and an output indicator. The delayed signal in channel E_2 is fed into the differential amplifier of channel E_1. Step variable and continuously variable delay lines are

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			

PROCUREM'T INFO.:

PROCUREM'T COG.: DESIGN COG.: Commercial

.I.I.N.: FUNCTIONAL CLASS. NO.: 6.1.8

PHASE DETECTOR
TYPE 205A1
(AD-YU Electronics Laboratory, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

used to delay one of the two input signals for a length of time sufficient to cause the output indicator to register zero or a minimum value. The time delay or phase angle is read directly from the dial settings in degrees or microseconds.

Power Supply: 115 volts ±15%, AC, 50 to 60 cycles per second, single phase, 50 watts.

Frequency Range: 100 kilocycles per second to 15 megacycles per second.

Resolution Time: 80 micromicroseconds.

Time Delay: 0 to 11.1 microseconds, total.

Phase Angle Range: 360 times the signal frequency in megacycles per second times the total delay time is microseconds, maximum.

Input Impedance: 1 megohm shunted by 12 micromicrofarads direct; 4 micromicrofarads with probes.

Indicator Sensitivity: 0.05 volts full scale; 0.5 volts full scale with probe.

Accuracy: ±0.05 degrees or ±1% of dial reading, whichever is greater.

MANUFACTURERS' OR CONTRACTORS' DATA:

AD-YU Electronics Laboratory, Incorporated, 249 Terhune Avenue, Passiac, New Jersey; Approximate Cost per Unit, $698.00.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Phase Detector 205A1 AD-YU Electronics Lab					

PHASE DETECTOR
TYPE 205A1
(AD-YU Electronics Laboratory, Incorporated)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Phase Detector (AD-YU Model 205).						
1	Delay Line (AD-YU Model A1)						

PHASE SEQUENCE INDICATOR
MODEL K-3
(Electrical Facilities Incorporated)

UNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument used to indicate the phase sequence a multiphase power supply. It can also be used for making continuity tests of rcuits of polyphase systems. The indicator consists of three windows which are acked out in phase sequence.

ELATIONSHIP TO OTHER EQUIPMENT:

Used in testing Close Cooperation Set AN/MPQ-2 and Close Support Control Sets N/MSQ-1, AN/MSQ-1A, and AN/MSQ-2.

LECTROMECHANICAL DESCRIPTION:

rcuit Information: The instrument consists of a three-phase induction motor with the rotor used to black out the windows on the instrument face in phase sequence.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.:		DESIGN COG.: Commercial	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.8	
	- Electronics Test Equipment	-Electrical Facilities K-3	

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

PHASE SEQUENCE INDICATOR
MODEL K-3
(Electrical Facilities Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Tests Power Supplies with the following characteristics:

Frequency: 25 to 60 cycles per second. Suitable for frequencies above 60 cycles per second provided the circuit voltages are equal to, or exceed, the following

150 volts for 133 cycles per second
200 volts for 180 cycles per second
250 volts for 360 cycles per second.
300 volts for 400 cycles per second.

Voltage: 60 to 600 volts.

MANUFACTURERS' OR CONTRACTORS' DATA:

Electrical Facilities, Inc., 4224 Holden Street, Oakland 8, California.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog Sec. D Bulletin No. 415.
Manufacturer's Instruction Sheet No. 427.

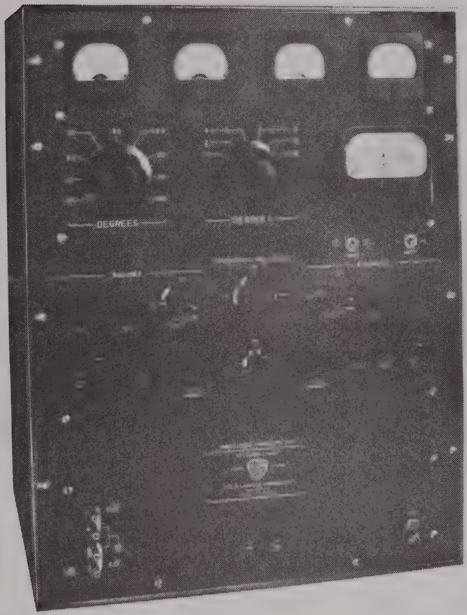
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches) H	W	D	Weight Packed (Lbs.)
1	Phase Sequence Indicator Model K-3					1.5

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches) H	W	D	Weight (Lbs.)
1	Phase Sequence Indicator Model K-3	Phenolic			3-1/4 dia.	5/8 deep	1.31

LOW FREQUENCY PHASE METER
TYPE P-1060
(W. L. Maxson Corporation)



UNCTIONAL DESCRIPTION:

A ground transportable, general purpose test equipment designed for laboratory
e and used for measurements of phase difference at audio frequencies. Appli-
tions would include: testing of polyphase systems, testing of goniometers, and
sting of wideband phase-shifting networks for single-sideband transmitters, feed-
ck amplifier testing, measurement of residual L and C in resistor units. The in-
cating meter is calibrated in degrees.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: Utilizes the null principle of measurement. A generated phase shift produced within the phasemeter is balanced against the unknown phase difference. Consists of two signal channels, one for each of the signals whose phase

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:	DESIGN COG.:	Commercial	
F.I.I.N.:	FUNCTIONAL CLASS. NO.:	6.1.8	
	- Electronics Test Equipment -	Maxson Type P-1060	

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

LOW FREQUENCY PHASE METER
TYPE P-1060
(W. L. Maxson Corporation)

ELECTROMECHANICAL DESCRIPTION: (Continued)

difference is being measured. These channels terminate in a phase detecto which need only indicate when phase quadrature exists between its input signals Two phase shifters, one "Calibrated" and the other "Uncalibrated," are inserte in series with one or the other channel. Either phase shifter, then, can modif the phase difference between signals at the phase-detector input as compared wit those at the phasemeter input.

Power Supply: 115 volts, ±10%, AC, single phase, 60 cycles per second, 200 watts
Frequency Range: 30 to 20,000 cycles per second.
Phase Range: 0 to 360°.
Input Voltages: 0.5 to 15 volts.
Input Impedance: 10 megohms shunted by 25 micromicrofarads.
Signal Level: 0.5 to 10 volts, rms.
Accuracy: 0.1° absolute (0.01° for incremental angles up to 2°).

MANUFACTURERS' OR CONTRACTORS' DATA:

The W. L. Maxson Corporation, 460 West 34th Street, New York, New York.

TUBE COMPLEMENT:

8 RETMA-12AT7, 18 RETMA-12AX7, 6 RETMA-6AU6, 2 RETMA-5678, RETMA-5647, 2 RETMA-5U4G, 1 RETMA-5651, 2 RETMA-6AS7.

REFERENCE DATA AND LITERATURE:

Manufacturer's Bulletin 950.
Manufacturer's Handbook of Instructions.
"Precision Phasemeter for Audio Frequencies" by J. Kritz (Pamphlet).

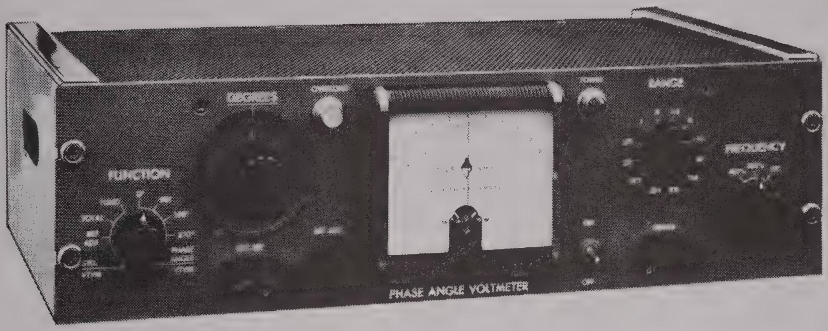
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Phase Meter, Low Frequency Type P-1060	Wood and Aluminum		25	19-1/2	16-1/4	110

PHASE ANGLE VOLTMETER
MODEL VM-204-s151
(North Atlantic Industries, Inc.)



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used to measure and analyze complex AC signals at three frequencies. The instrument may be used to measure magnitude and phase angles of signals or may be used as a null indicator.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 volts ±10%, AC, 60 to 400 cycles per second, approximately 60 watts at 60 cycles per second.
Frequency Range: 60 to 4500 cycles per second, option of any three frequencies.
Alternating Voltage:
  Range: 1 millivolt to 300 volts, in 12 ranges.
  Accuracy: ±2% of full scale.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.8	
	- Electronics Test Equipment -		NAI VM-204-s151

PHASE ANGLE VOLTMETER
MODEL VM-204-s151
(North Atlantic Industries, Inc.)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Phase Angle Accuracy: ±3% of full scale degrees for Ecos Θ characteristic, for up to 5:1 full scale overload.

Phase Angle Dial Accuracy: ±1 degree.

Meter Response: 10 cycles per second to 50 kilocycles per second as a vacuum tube voltmeter.

Signal Input Impedance: 10 megohms.

Reference Input Impedance: 100,000 ohms.

Reference Input: 0.25 volt minimum.

Noise: Less than 5 microvolts.

Nulling Sensitivity: Less than 2 microvolts in phase sensitive mode.

Harmonic Rejection: 55 decibels with selective filters.

MANUFACTURERS' OR CONTRACTORS' DATA:

North Atlantic Industries, Incorporated, Terminal Drive, Plainview, Long Island, New York.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Phase Angle Voltmeter North Atlantic Industries VM-204-s151	metal		5-1/4	19	9	

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.)
			H	W	D	
	Phase Angle Voltmeter NAI VM-204-s151					

Q METER TS-617/U

UNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument designed to measure the ratio of actance to resistance (i.e., Q) of a coil, a condenser, or other circuit elements ving two accessible terminals. It will measure the Q of RF Coils, AF Coils, riable condensers, small fixed condensers, and insulating materials; in addition, e effective series resistance, capacitance, inductance and fundamental frequencies small antennas may be determined over a wide frequency range. A vacuum tube ltmeter is calibrated directly in Q and in volts; another meter "Multiply Q By" tends the range. The frequency dial is calibrated in kilocycles per second and egacycles per second, and the tuning condenser is calibrated in micromicrofarads.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to Boonton Radio Corporation Type 160-A Q Meter.

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.	7CAC-680150	F17-M-31771-5501	3F3381
ROCUREM'T INFO.: SigC Spec. 71-3357 dated 29 November 1949.			
ROCUREM'T COG.: Army		DESIGN COG.: Army, CSL	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.9	
	- Electronics Test Equipment -		TS-617/U

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

Q METER TS-617/U

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The Q meter consists of an RF oscillator, a measuring circuit consisting of a main and vernier tuning condenser which tune the external coil to be measured, a vacuum tube voltmeter which reads the voltage developed across the tuning condenser, and a means for introducing a known amount of the oscillator voltage in series with the measuring circuit.

The procedure in measuring Q consists of either adjusting the oscillator to a predetermined frequency and tuning the circuit under measurement to resonance, or conversely of tuning the circuit with a predetermined capacitance and adjusting the oscillator to resonance. At resonance the voltmeter indicates directly the Q of the circuit.

Power Supply: 105 to 120 volts or 210 to 240 volts, AC, 50 to 60 cycles per second, single phase, 50 watts.

Frequency Range: 50 kilocycles per second to 75 megacycles per second in eight self-contained ranges. In conjunction with an external oscillator the low range can be extended down to 1.0 kilocycles per second.

Range of Circuit Q Measurements: 20 to 625.

Voltmeter Range: 0 to 5 volts AC.

"Multiply Q By" Meter Range: X1, X1.1, X1.2, X1.3, X1.4, X2, X2.5.

Capacitance Calibration Range:

Main Tuning Condenser: 30 to 450 micromicrofarads, calibrated in 1 micromicrofarad divisions from 30 to 100 micromicrofarads, and in 5 micromicrofarad divisions from 100 to 450 micromicrofarads.

Vernier Condenser: +3.0 micromicrofarads to -3.0 micromicrofarads, calibrated in 0.1 micromicrofarad divisions.

Accuracy:

Frequency Calibration: Generally better than ±1% except the 50 to 75 megacycles per second range which is approximately ±3%.

Circuit Q Measurements: Approximately ±5% for all frequencies up to the region of 30 megacycles per second; accuracy decreases with increasing frequency.

Capacitance Calibration: Generally better than 1% or 1 micromicrofarad whichever is greater.

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Boonton, New Jersey; Approximate Cost per Unit, $625.00.

TUBE COMPLEMENT:

1 JAN-45, 1 JAN-2A6, 1 JAN-5W4.

REFERENCE DATA AND LITERATURE:

TM 11-2635 (Instruction Book).

Q METER TS-617/U

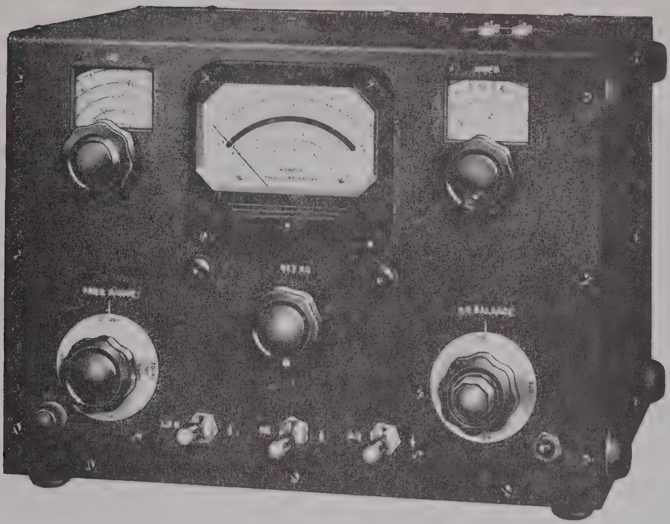
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Q Meter TS-617/U	Metal	7CAC-680150 F17-M-31771-5501 3F3381	12-1/2	20	8-1/2	25

Q METER ZM-22/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment designed to measure the circuit Q (figure of merit) in the very high frequency range. The test instrument may be used for measurements of coils, capacitors, resistors, intermediate frequency and radio frequency transformers and dielectrics. Measurements can be made of antennas and coupling networks. Transmission line parameters necessary to compute characteristic impedance, attenuation, and propagation velocity can be evaluated.

RELATIONSHIP TO OTHER EQUIPMENT:

The ZM-22 is the military designation for the Boonton 190-A.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The Q meter is basically comprised of a self-contained, continuously variable oscillator with a controlled and measured output. The output is applied, in series, with a series-tuned, resonant circuit. A high impedance vacuum tube voltmeter is connected across the internal variable capacitor

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.		(ASO)R16M-1938-100	
PROCUREM'T INFO.: Navy			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuAer	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.9	

Q METER ZM-22/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

portion of the tuned circuit to measure the reactive voltage in terms of circuit Q. The inductive portion of the tuned circuit is connected externally and represents the unknown to be measured.

Power Supply: 90 to 130 volts, AC, 60 cycles per second, 55 watts.

Frequency Range: 20 to 260 megacycles per second continuously variable in four ranges.

Frequency Accuracy: ±1%.

Q Range: 5 to 1200.

Q Accuracy: ±7% to 100 megacycles, ±15% to 260 megacycles for circuit Q of 400.

Internal Resonating Capacitance Range:
7.5 to 100 micromicrofarads in .01 micromicrofarad increments.

Accuracy of Internal Resonating Capacitor:
±0.2 micromicrofarad to 20 micromicrofarads.
±0.3 micromicrofarad to 50 micromicrofarads.
±0.5 micromicrofarad to 100 micromicrofarads.

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Boonton, New Jersey; Contract No. N383s-9038Z;

Approximate Cost per Unit $625.00.

TUBE COMPLEMENT:

1 538A (Selected 1 2AT7), 2 5718, 1 537A (Selected 9005), 1 9005, 1 OB2.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog "K".

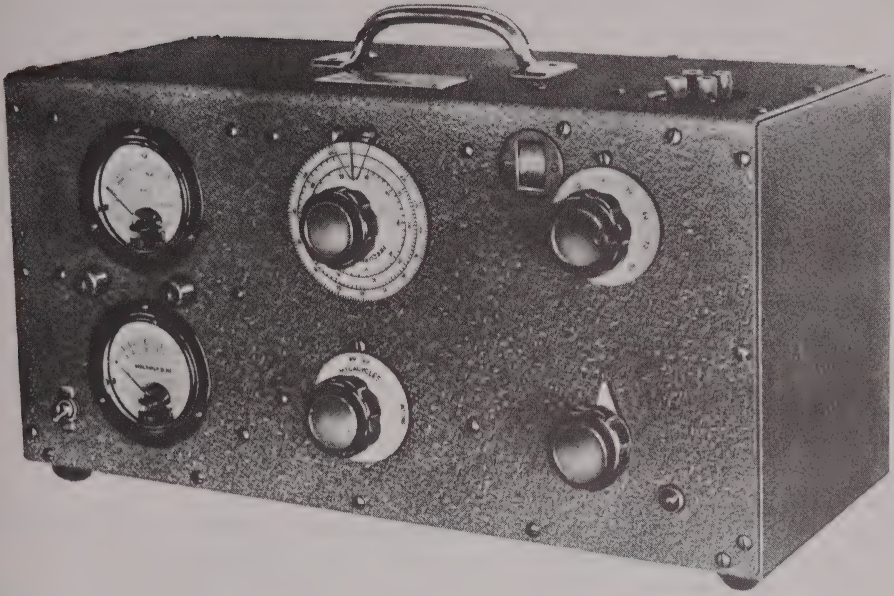
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Q Meter, ZM-22/U.		(ASO)R16M-1938-100	10-1/2	13-1/8	9-1/2	25

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packe (Lbs.)
			H	W	D	
1	Q Meter, ZM-22/U		12-1/2	15-1/8	11-1/2	32 (Domestic)

Q METER TYPE 170-A
(Boonton Radio Corporation)



UNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument designed to measure the ratio of actance to effective resistance or Q of a coil, a condenser, or other circuit elements having two accessible terminals. It will measure the Q of RF coils, AF coils, riable condensers, small fixed condensers, and insulating materials; in addition, e effective series resistance, capacitance, inductance, and fundamental frequencies small antennas may be determined over a wide frequency range. A vacuum tube ltmeter is calibrated directly in Q; another meter "Multiply Q by" extends the nge. The frequency dial is calibrated in megacycles, and the tuning condenser is librated in micromicrofarads.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to Boonton Types 100-A and 160-A Q Meters except that the 170-A has odifications to accommodate a higher frequency range.

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.:		DESIGN COG.: Commercial	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.1.9	
	- Electronics Test Equipment -		Boonton Type 170-A

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

Q METER TYPE 170-A

(Boonton Radio Corporation)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The Q meter consists of an RF oscillator, a measuring circuit consisting of a tuning condenser which tunes the external coil to be measured, a vacuum tube voltmeter which reads the voltage developed across the tuning condenser, and a means for introducing a known amount of the oscillator voltage in series in the measuring circuit.

The procedure in measuring Q consists of either adjusting the oscillator to a predetermined frequency and tuning the circuit under measurement to resonance, or conversely, of tuning the circuit with a predetermined capacitance and adjusting the oscillator to resonance. At resonance, the voltmeter indicates directly the Q of the circuit.

Power Supply: 115 volts ±5 volts, or 210 volts ±10 volts, AC, 50 to 60 cycles per second, single phase, 50 watts.

Frequency Range (Oscillator): 30 to 200 megacycles per second in three ranges.

Range of Q Measurements: 80 to 1200.

Voltmeter Range: 80 to 300. With a multiplying factor of 4, the range is extended to 1200.

Capacitance Range of Q Condenser: 11 to 60 micromicrofarads.

Accuracy:

Frequency Calibration: ±1%.

Q Measurements: ±10% up to 100 megacycles per second; accuracy decreases with increasing frequency.

Capacitance Calibration: ±1% or ±0.5 micromicrofarads, whichever is greater.

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Boonton, New Jersey; Approximate Cost per Unit, $550.00, dated 1 June 1947.

TUBE COMPLEMENT:

1 RETMA-9002, 2 RETMA-955, 2 RETMA-VR-105/30, 1 RETMA-5W4, 1 Mazda 47.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog G.

SHIPPING DATA:

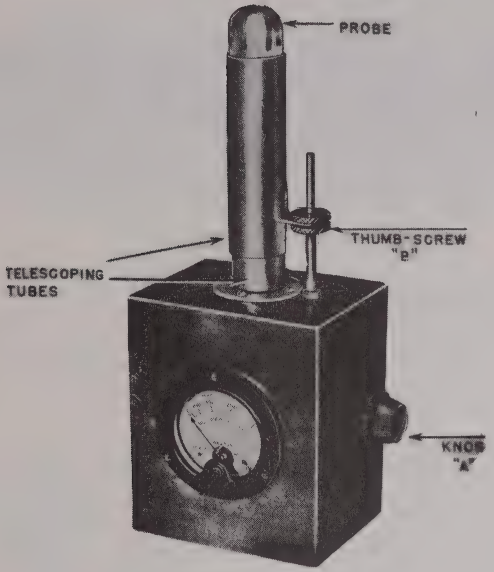
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case [illegible]	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Q Meter Type 170-A			10-1/2	17	8-3/4	21

6.2 STANDING-WAVE MEASURING EQUIPMENT

TEST SET I-148-A
(INDICATOR, STANDING-WAVE, I-148-A)



UNCTIONAL DESCRIPTION:

A portable, general purpose, test instrument used to measure the standing-wave ıtio of the RF voltage along a non-resonant transmission line. It may also be used check the balance to ground of a parallel, two wire, open, non-resonant trans- ission line. Measurements are indicated on a milliammeter. The meter is cali- ated to give square-law voltage readings so it is only necessary to figure the ratio the maximum to the minimum voltage in order to obtain the standing-wave ratio.

ELATIONSHIP TO OTHER EQUIPMENT:

Part of Test Equipment RC-70-A.

LECTROMECHANICAL DESCRIPTION:

rcuit Information: The instrument consists of a parallel resonant circuit tuned to the transmission line frequency and capacitively coupled to the RF transmission line.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Standard		
TOCK NOS.	7CAC-439743-5		3F4148A
ROCUREM'T INFO.: Dwg. No. ES-D-11133			
ROCUREM'T COG.: Army		DESIGN COG.: Army, ESL	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2	
- Electronics Test Equipment -			I-148-A

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

TEST SET I-148-A
(INDICATOR, STANDING-WAVE, I-148-A)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: None required.

Frequency Range: 100 to 120 megacycles per second.

Meter Scale: 0 to 250 milliamperes.

Accuracy: ±10%.

MANUFACTURERS' OR CONTRACTORS' DATA:

Espey Manufacturing Company, New York, New York; Order No. 1031-SCRL-42;
Approximate Cost per Unit, $51.18, January 1952.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-40RC70-2 (Operating Instructions on RC-70-A).
TM 11-1043 (Instruction Book on RC-70-A).

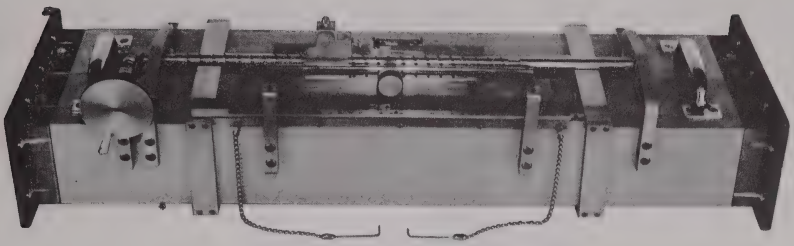
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set I-148-A	Bakelite	7CAC-439743-5 3F4148A	11	5	3	3

RADAR TEST SET AN/UPM-24



JNCTIONAL DESCRIPTION:

A portable, general purpose slotted line used to determine standing wave ratios waveguides. It may also be used to determine the frequency of the RF energy in vaveguide.

ELATIONSHIP TO OTHER EQUIPMENT:

The slotted line is designed for use with the type RG-69/U waveguide or another veguide of equal dimensions.

Equipment required but not supplied: An amplifier with indicator and a probe such MX-831/U or MX-1019/U.

LECTROMECHANICAL DESCRIPTION:

rcuit Information: The slotted section of waveguide is approximately one wave length long (for the frequencies for which it is used). A probe, which is mounted on the slot, samples the RF field in the slot. The RF field induces an RF voltage in the probe, which is proportional to the field strength in the slot at the probe position. The induced RF current is then transmitted to a bolometer or crystal rectifier, then to an amplifier, and subsequently to an output meter. By moving the probe, it is possible to find regions of maxima and minima energy in the slotted line. From this information it is possible to determine the voltage standing wave ratio and the frequency of the RF energy in the waveguide.

wer Supply: None required.

equency Range: 1120 to 1700 megacycles per second.

allest Scale Reading: ±0.01 centimeter.

ltage Standing Wave Ratio Measurement: 1.05 minimum.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
OCK NOS.	7CAC-801319-2235		
ROCUREM'T INFO.: USAF Spec. MIL-R-4634 & Am. 1 dtd 30 April 1953			
ROCUREM'T COG.: USAF		DESIGN COG.: USAF, Rome	
I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.1	
- Electronics Test Equipment -			AN/UPM-24

roject was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

ELECTROMECHANICAL DESCRIPTION: (Continued)

Error Due to Slope: 2% maximum.
Error Due to Slot Leakage: 1% maximum.

MANUFACTURERS' OR CONTRACTORS' DATA:

Nichols Products Company, Inc., 325 West Main Street, Moorestown, Ne Jersey; USAF Contract AF 33(038)-14405, dated 22 June 1950.

Press Wireless Manufacturing Company, Inc., 25 Prospect Avenue, West Newto 65, Massachusetts; USAF Contract AF 33(038)-16362, dated 12 October 195

Approximate Cost per Unit, $800.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

33A1-6-6-1 (Operation and Service Instructions).
33A1-6-6-4 (Parts Breakdown).

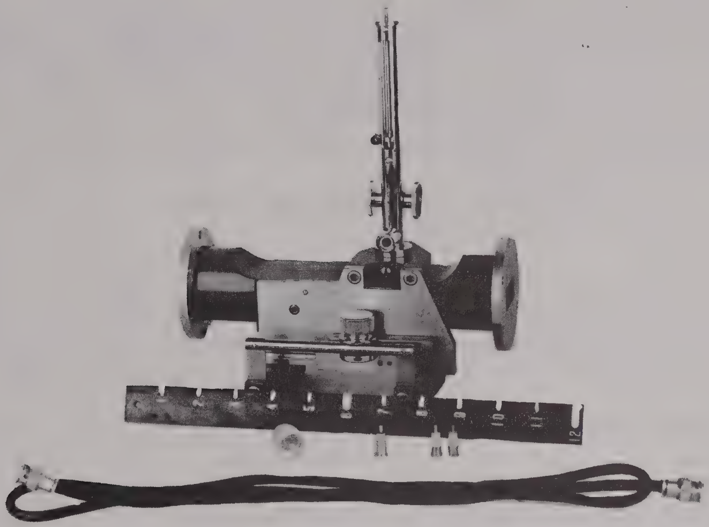
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set AN/UPM-24 Including:		7CAC-801319-2235				
1	Slotted Line IM-28/U		7CAC-439744 3F2732-28	30	8-3/4	10-1/2	15-3/4
1	Transmission Line Case CX-1090/UPM-24	Steel		31-1/4	14 dia.		32

IMPEDANCE MEASURING TEST SET AN/USM-6
(TEST SET, RADAR AN/USM-6)



UNCTIONAL DESCRIPTION:

A portable, general purpose, test set used in measuring wavelength and in deter-
ining voltage or power standing wave ratio and impedance of waveguide systems
d components of radar and radio sets in its frequency range. This set is used in
pot testing. Indication is on a meter calibrated in voltage standing wave ratio, which
part of Standing Wave Indicator TS-12/AP.

ELATIONSHIP TO OTHER EQUIPMENT:

This set is used with Standing Wave Indicator TS-12/AP, which is required but
t supplied.

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The slotted line is inserted between the signal source and the
termination to be investigated. A sample of the RF energy is extracted from the

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Substitute Standard		
TOCK NOS.			
ROCUREM'T INFO.:	USAF Exhibit ENG-335		
ROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, Rome
.I.I.N.:		FUNCTIONAL CLASS. NO.:	6.2.1

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

IMPEDANCE MEASURING TEST SET AN/USM-6
(TEST SET, RADAR AN/USM-6)

ELECTROMECHANICAL DESCRIPTION: (Continued)
slotted section by the RF probe. This energy is detected by a crystal or bolo meter and fed to a standing wave indicator which amplifies the detected signa and presents it on a meter calibrated in voltage standing wave ratio. By moving the probe in its carriage along the slotted line, the voltage standing wave ratio and the positions of maxima and minima may be obtained. With this infor mation, wavelength and impedance of the termination may be calculated.

Power Supply: None required.

Frequency Range: 5850 to 8200 megacycles per second.

Transmission Line: 1.50" x 0.750".

MANUFACTURERS' OR CONTRACTORS' DATA:
Nassau Research and Development Associates, Inc., Subsidiary of Peerless Instrument Company, 66 Main Street, Mineola, New York; USAF Contract AF 33(604 7867 dated 14 September 1953; Approximate Cost per Unit, $475.63.

TUBE COMPLEMENT:
1 JAN-1N23.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

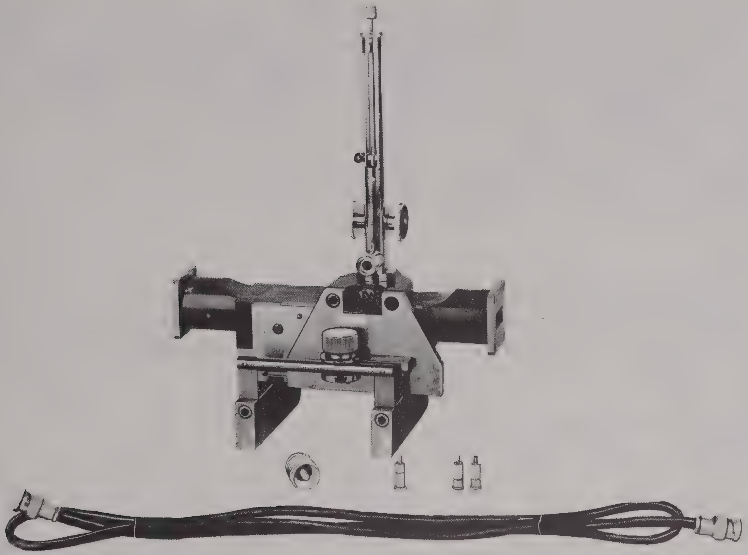
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

IMPEDANCE MEASURING TEST SET AN/USM-6
(TEST SET, RADAR AN/USM-6)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Impedance Measuring Test Set AN/USM-6 Including:			9-3/4	5-1/2	6-1/2	12
1	Slotted Line IM-45/U						
1	RF Probe MX-1019/U		7CAC-657350 3F3703-3.3	7-3/4	1-3/8	2	
2	Adatper UG-273/U		8850-102000 RE 49F389 2Z308-273	1-3/8	5/8 dia.		
1	Bolometer Polytechnic No. 610						
1	Crystal 1N23						
1	Cord CG-426/U			84 long			
1	Case CY-781/U			9-3/4	5-1/2	6-1/2	

IMPEDANCE MEASURING TEST SET AN/USM-7
(TEST SET, RADAR, AN/USM-7)



UNCTIONAL DESCRIPTION:

A portable, general purpose, test set used in measuring wavelength and in de-
rmining voltage or power standing wave ratio and impedance of waveguide systems
d components of radar and radio sets in its frequency range. This set is used in
pot testing. Indication is on a meter calibrated in voltage standing wave ratio,
iich is part of Standing Wave Indicator TS-12/AP.

ELATIONSHIP TO OTHER EQUIPMENT:

This set is used with Standing Wave Indicator TS-12/AP, which is required but
t supplied.

LECTROMECHANICAL DESCRIPTION:

rcuit Information: The slotted line is inserted between the signal source and the
termination to be investigated. A sample of the RF energy is extracted from the

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Standard		
TOCK NOS.	7CAC-439739		3F3948-7
ROCUREM'T INFO.: Spec. MIL-I-4103A and USAF Spec. 7540			
ROCUREM'T COG.: USAF	DESIGN COG.: USAF, Rome		
.I.I.N.:	FUNCTIONAL CLASS. NO.: 6.2.1		
- Electronics Test Equipment -	AN/USM-7		

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

IMPEDANCE MEASURING TEST SET AN/USM-7
(TEST SET, RADAR, AN/USM-7)

ELECTROMECHANICAL DESCRIPTION: (Continued)

slotted section by the RF probe. This energy is detected by a crystal or bolom eter and fed to a standing wave indicator which amplifies the detected signal a presents it on a meter calibrated in voltage standing wave ratio. By moving t probe in its carriage along the slotted line, the voltage standing wave ratio a the positions of maxima and minima may be obtained. With this informatio wavelength and impedance of the termination may be calculated.

Power Supply: None required.
Frequency Range: 7050 to 10, 000 megacycles per second.
Transmission Line: 1.25" x 0.625".

MANUFACTURERS' OR CONTRACTORS' DATA:

Wac Engineering Corporation, 35 South St. Clair Street, Dayton, Ohio; USA
Contract AF 33(604)6320, dated 15 April 1953; Approximate per Unit, $445.0

TUBE COMPLEMENT:

1 JAN-1N23.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

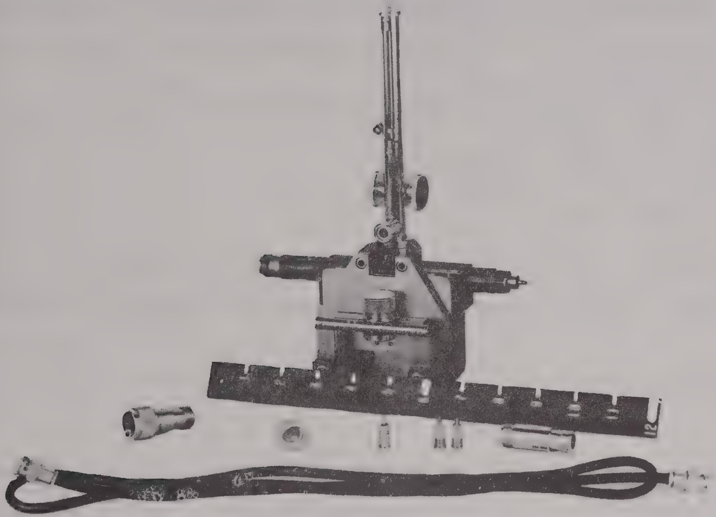
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	

IMPEDANCE MEASURING TEST SET AN/USM-7
(TEST SET, RADAR, AN/USM-7)

QUIPMENT SUPPLIED:

uant. Per q'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Impedance Measuring Test Set AN/USM-7 Including:		7CAC-439739	9-1/2	5-1/2	6-1/2	11
1	Slotted Line IM-43/U						
1	RF Probe MX-1019/U		7CAC-657350 3F3703-3.3	7-3/4	1-3/8	2	
2	Adapter UG-273/U		8850-102000 RE 49F389 2Z308-273	1-3/8	5/8 dia.		
1	Bolometer Polytechnic No. 610						
1	Crystal 1N23						
1	Cord CG-426/U			84 long			
1	Case CY-786/U	Aluminum		9-1/2	5-1/2	6-1/2	

IMPEDANCE MEASURING TEST SET AN/USM-11
(TEST SET, RADAR AN/USM-11)



NCTIONAL DESCRIPTION:

A portable, general purpose, test set used in measuring wavelength and in deter- ning voltage or power standing wave ratio and impedance of waveguide systems l components of radar and radio sets in its frequency range. This set is used in pot testing. Indication is on a meter calibrated in voltage standing wave ratio, which part of Standing Wave Indicator TS-12/AP.

LATIONSHIP TO OTHER EQUIPMENT:

This set is used with Standing Wave Indicator TS-12/AP, which is required but supplied.

ECTROMECHANICAL DESCRIPTION:

rcuit Information: The slotted line is inserted between the signal source and the termination to be investigated. A sample of the RF energy is extracted from the slotted section by the RF probe. This energy is detected by a crystal or bolometer and fed to a standing wave indicator which amplifies the detected signal

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Substitute Standard		
OCK NOS.			
ROCUREM'T INFO.:	USAF Exhibit ENG-336		
ROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, Rome
I.I.N.:		FUNCTIONAL CLASS. NO.:	6.2.1
	- Electronics Test Equipment -		AN/USM-11

oject was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

IMPEDANCE MEASURING TEST SET AN/USM-11
(TEST SET, RADAR AN/USM-11)

ELECTROMECHANICAL DESCRIPTION: (Continued)
and presents it on a meter calibrated in voltage standing wave ratio. By movin the probe in its carriage along the slotted line, the voltage standing wave rati and the positions of maxima and minima may be obtained. With this informatio wavelength and impedance of the termination may be calculated.

Power Supply: None required.
Frequency Range: 3950 to 10,000 megacycles per second.
Impedance: 49.4 ohms.
Transmission Line: 3/8 inch coaxial.
Vernier Scale: 4.5 to 11.7 centimeters.
Accuracy: ±0.005 centimeters.

MANUFACTURERS' OR CONTRACTORS' DATA:
Polytechnic Research and Development Corporation, Brooklyn, New York; USA
Contract W28(099)-ac-190.

TUBE COMPLEMENT:
1 JAN-1N21B.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

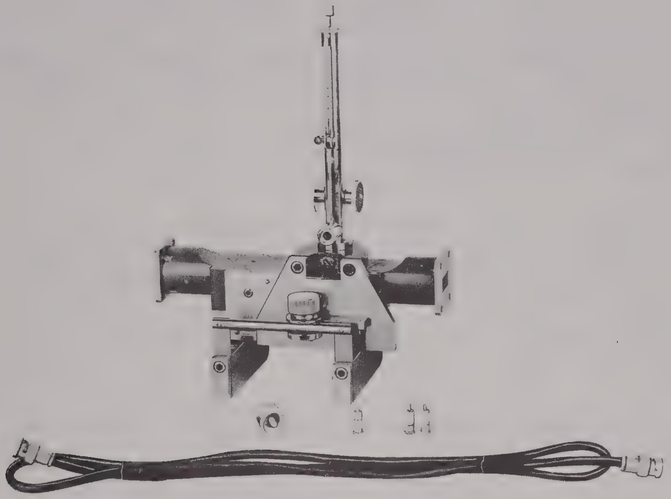
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weig Packe (Lbs.
			H	W	D	

IMPEDANCE MEASURING TEST SET AN/USM-11
(TEST SET, RADAR AN/USM-11)

QUIPMENT SUPPLIED:

uant. Per q'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Impedance Measuring Test Set AN/USM-11 Including:			8-1/2	4-1/2	5-3/4	8
1	Line Section, Radio Frequency Transmission CG-1252/U						
1	RF Probe MX-1019/U		7CAC-657350 3F3703-3.3	7-3/4	1-3/8	2	
2	Adapter UG-273/U		8850-102000 RE 49F389 2Z308-273	1-3/8	5/8 dia.		
1	Bolometer Polytechnic No. 610						
1	Crystal 1N21B						
1	Cord CG-426/U			84 long			
1	Case CY-784/U			8-1/2	4-1/2	5-3/4	
1	Adapter Connector UG-370/U						
1	Adapter Connector UG-371/U						

IMPEDANCE MEASURING TEST SET AN/USM-14
(TEST SET, RADAR AN/USM-14)



UNCTIONAL DESCRIPTION:

A portable, general purpose, test set used in measuring wavelength and in deter-
ining voltage or power standing wave ratio and impedance of waveguide systems
d components of radar and radio sets in its frequency range. This set is used in
pot testing. Indication is on a meter calibrated in voltage standing wave ratio,
ich is part of Standing Wave Indicator TS-12/AP.

ELATIONSHIP TO OTHER EQUIPMENT:

This set is used with Standing Wave Indicator TS-12/AP, which is required but
t supplied.

LECTROMECHANICAL DESCRIPTION:

rcuit Information: The slotted line is inserted between the signal source and the
termination to be investigated. A sample of the RF energy is extracted from
the slotted section by the RF probe. This energy is detected by a crystal or

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Substitute Standard		
TOCK NOS.			

ROCUREM'T INFO.: USAF Exhibit ENG-337
ROCUREM'T COG.: USAF DESIGN COG.: USAF, Rome
.I.I.N.: FUNCTIONAL CLASS. NO.: 6. 2. 1

roject was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

IMPEDANCE MEASURING TEST SET AN/USM-14
(TEST SET, RADAR AN/USM-14)

ELECTROMECHANCIAL DESCRIPTION: (Continued)

bolometer and fed to a standing wave indicator which amplifies the detected signa and presents it on a meter calibrated in voltage standing wave ratio. By movin the probe in its carriage along the slotted line, the voltage standing wave rati and the positions of maxima and minima may be obtained. With this information wavelength and impedance of the termination may be calculated.

Power Supply: None required.
Frequency Range: 8200 to 12,400 megacycles per second.
Transmission Line: 1.00" x 0.500".

MANUFACTURERS' OR CONTRACTORS' DATA:

Polytechnic Research and Development Corporation, Brooklyn, New York; D.E.O. No. 185-15; Approximate Cost per Unit, $500 to $1000.00.

TUBE COMPLEMENT:

1 JAN-1N23.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

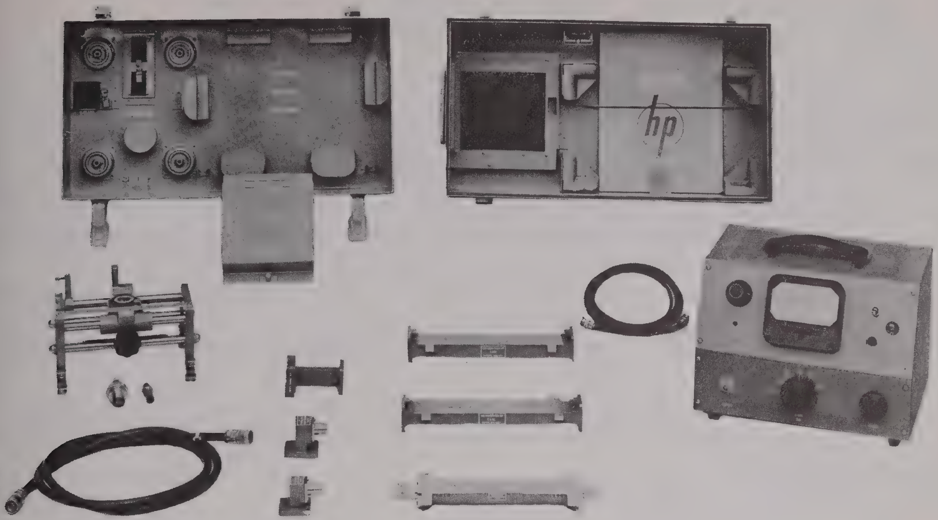
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

IMPEDANCE MEASURING TEST SET AN/USM-14
(TEST SET, RADAR AN/USM-14)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Impedance Measuring Test Set AN/USM-14 Including:			9-1/2	6-1/2	8-1/4	17
1	Slotted Line IM-17/U						
1	RF Probe MX-1019/U		7CAC-657350 3F3703-3. 3	7-3/4	1-3/8	2	
2	Adapter UG-273/U		8850-102000 RE 49F389 2Z308-273	1-3/8	5/8 dia.		
1	Bolometer Polytechnic No. 610						
1	Crystal 1N23						
1	Cord CG-426/U			84 long			
1	Case CY-785/U			9-1/2	6-1/2	8-1/4	

STANDING WAVE INDICATOR AN/USM-37



UNCTIONAL DESCRIPTION:

A portable, general purpose equipment used for measuring standing wave ratio and npedance or impedance match of transmission systems, various types of termina-ons such as antennas and loads, and other high frequency devices such as connec-ors.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to Hewlett-Packard Model 415A Standing Wave Indicator.

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The Standing Wave Indicator IM-97/USM-37 is a high gain, selective amplifier which has an indicating meter as its output. The amplifier is tuned to 1,000 cycles per second so that the signal source with which it is used must be amplitude modulated with 1,000 cycles per second. The indicating meter, calibrated in standing wave ratio and decibels, is an average reading type operating in a full wave rectifier circuit. The linear voltmeter is calibrated for square law readings because of the square law characteristics of crystals and bolometers.

The waveguide probe houses a 1N25 Crystal which is a square law detector element. The probe penetration is adjustable.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.: USN	DESIGN COG.: USN, BuShips		
.I.I.N.:	FUNCTIONAL CLASS. NO.: 6.2.1		
	- Electronics Test Equipment -		AN/USM-37

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A

STANDING WAVE INDICATOR AN/USM-37

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 volts, AC, 50 to 60 cycles per second, single-phase.

Frequency Range:

Standing Wave Indicator: 1,000 cycles per second ±2%.

Waveguide Section: 7050 to 12400 megacycles per second.

Coaxial Section: 3000 to 12000 megacycles per second.

Selectivity: Equivalent overall "Q" of unit is 20±5; therefore, at 70% points, bandwidth is of the order of 50 cycles per second wide (1000 cycles per second unit).

Sensitivity: 0.3 microvolt minimum to 0.3 volt maximum gives full scale deflection.

Equivalent Noise Level (referred to input): 0.04 microvolt maximum.

Calibration: For use with a square law detector; 0 to 60 decibels covered in 6 ranges; Accuracy ±0.1 decibel per 10 decibel step.

Gain Control: Adjusts meter to convenient level; range is approximately 30 decibels.

Input: Connects to crystal rectifier or bolometer. DC bias of 8 volts ±0.5 volts delivers approximately 0.75 milliampere to a 200-ohm bolometer or 1/100-ampere instrument fuse.

Meter Accuracy: ±0.1 decibel at "2" decibels.
±0.2 decibel at "4" decibels.

Standing Wave Ratio Decibel Range Switch Accuracy: ±0.1 decibel per any single step; ±2 decibels accumulative.

Probe Carriage: Probe travel calibrated 10 centimeters; can be read to 0.1 millimeter.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; Navy Contract NObsr-63074; Approximate Cost per Unit, $900.00.

TUBE COMPLEMENT:

2 JAN-6SN7GT, 1 JAN-6SL7GT, 1 JAN-5Y3GT, 1 JAN-6V6, 1 JAN-6SQ7GT, 1 JAN-OD3/VR150.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 92036 (Instruction Book).

SHIPPING DATA:

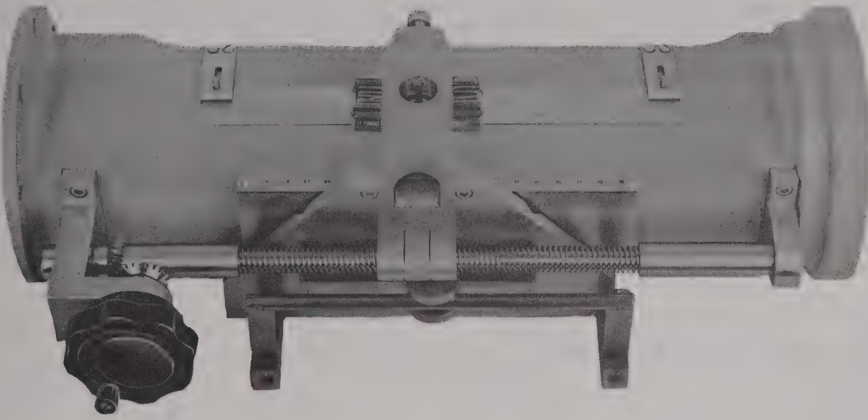
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Standing Wave Indicator AN/USM-37	7.2	20	31	20	77

STANDING WAVE INDICATOR AN/USM-37

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Standing Wave Indicator AN/USM-37						
	Including:						
1	Indicator, Standing Wave IM-97/USM-37	Aluminum		9	12	9	17
1	Case, Indicator CY-1463/USM-37	Aluminum		12	22	12	
1	Waveguide Assembly CG-1106/USM-37			1-7/8	2-1/2	10-1/4	
1	Waveguide Assembly CG-1107/USM-37			1-5/8	2-1/2	10-1/4	
1	Carriage, Probe MX-1545/USM-37			7-1/2	8	6	
1	Probe, Waveguide MX-1546/USM-37			2	1-1/4		
1	Cord CG-409/U						
1	Cord CG-92D/U						
1	Adapter UG-152/U			1-7/8	1-7/8	3-3/8	
2	Adapter Connector						
1	Slotted Line IM-100/USM-37			1-3/16	2-1/2	9-3/4	
1	Adapter, Coax. to Waveguide UG-1054/U			2-3/8	1-7/8	1-3/4	
1	Adapter, Coax. to Waveguide UG-1053/U			2-1/8	1-5/8	1-9/16	

SLOTTED LINE IM-23/U



and monitored by the Wright Air Development Center, ARDC - Carl L. Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.

FUNCTIONAL DESCRIPTION:

A portable, general purpose, slotted line, used in investigating the field distribution along a transmission line. It is used in organizational, field and depot testing of waveguide systems and components.

RELATIONSHIP TO OTHER EQUIPMENT:

Equipment required but not supplied: An amplifier with indicator and a probe such as MX-929/U or MX-1019/U.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A waveguide transmits the output of the equipment to be tested to this slotted line. Due to reflection of the radio frequency energy, a standing wave is set up. A radio frequency probe inserted into the slotted line picks up energy from the standing wave and transmits it to a bolometer. The bolometer is sensitive to heat radiation and indicates the power lost to it from the probe through heat radiation. Observations of such indications are made all along the

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.	7CAC-738422-5		3F2732-23
PROCUREM'T INFO.:			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, Rome	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.1	

SLOTTED LINE IM-23/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

slotted line until a pattern of the standing wave is established. The standing wave ratio, phase shift, attenuation, wavelength, power, and impedance, of the system being tested, can be calculated by making use of this standing wave pattern.

Power Supply: None required.

Frequency Range: 2600 to 3950 megacycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Nichols Products Company, Inc., 325 West Main Street, Moorestown, New Jersey. USAF Contract No. AF 33(038)-19077 dated 23 January 1951; Approximate Cost per Unit, $375.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

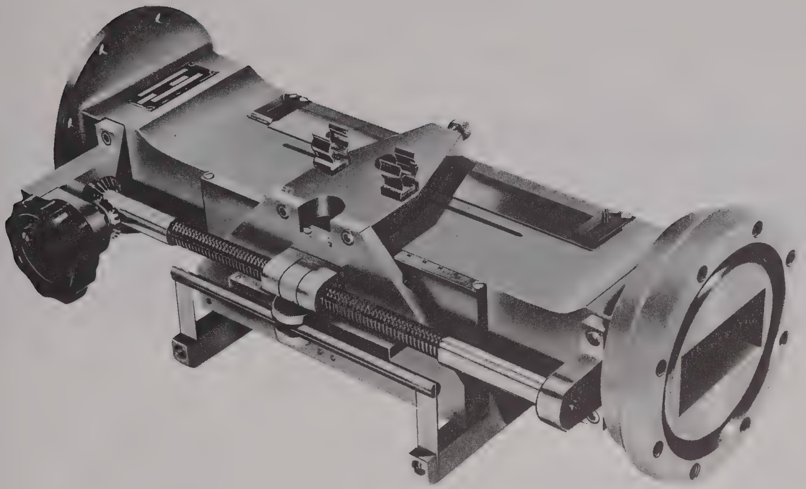
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

SLOTTED LINE IM-23/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches) H	W	D	Weight (Lbs.)
1	Slotted Line, IM-23/U Including:	Aluminum	7CAC-738422-5 3F2732-23	16	7-1/2	5	19
1	Slotted Section of 2.84" x 1.34" ID with worm-driven traveling carriage for test probe.						
1	Vernier Scale						
1	Cover, UG-53/U		1660-287732480 2Z3359-53				
1	Choke Cover, UG-54/U		1660-287732485 2Z3359-54				

SLOTTED LINE IM-23A/U



JNCTIONAL DESCRIPTION:

A portable, general purpose slotted line, used in investigating the field distribu-
n along a transmission line and for measuring impedance and wavelengths. It is
ed in organizational, field, and depot testing of waveguide systems and compo-
nts of various radar sets.

ELATIONSHIP TO OTHER EQUIPMENT:

This slotted line is used with Test Probe MX-1019/U for low power measure-
nts or with RF Probe MX-929/U for high power measurements. The IM-23A/U
interchangeable with the IM-23/U; the only difference is the one piece construc-
n of the body of the IM-23A/U.

LECTROMECHANICAL DESCRIPTION:

rcuit Information: A waveguide transmits the output of the equipment to be tested
to this slotted line. Due to reflection of the radio frequency energy, a standing
wave is set up. A radio frequency probe inserted into the slotted line picks up

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.	7CAC-726200		
ROCUREM'T INFO.:			
ROCUREM'T COG.: USAF		DESIGN COG.: USAF, Rome	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.1	
	- Electronics Test Equipment -		IM-23A/U

roject was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

SLOTTED LINE IM-23A/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

energy from the standing wave and transmits it to a bolometer. The bolomet indicates the power lost to it from the probe through heat radiation. Observ tions of such indications can be made all along the slotted line until a pattern the standing wave is established. The standing wave ratio, phase shift, attenu tion, wavelength, power, and impedance of the system being tested, can be fou by making use of this standing wave pattern.

Power Supply: None required.

Frequency Range: 2600 to 3950 megacycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Nichols Products Company, 325 West Main Street, Moorestown, New Jerse USAF Contract AF 33(038)19077 dated 23 January 1951, and USAF Contract AF (038)23760 dated 6 April 1951; Approximate Cost per Unit, $350.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

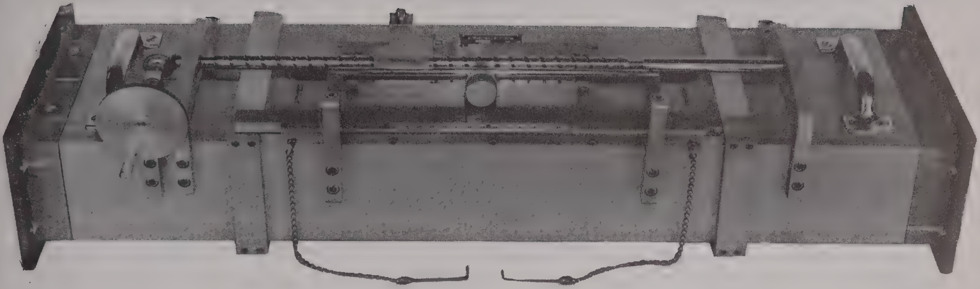
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weig Packe (Lbs
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weig (Lbs
				H	W	D	
1	Slotted Line IM-23A/U Including:	Aluminum	7CAC-726200	16	8-5/8	5-5/8	25
1	Slotted Section of 2.84"x 1.34" ID with worm-driven traveling carriage for test probe						
1	Vernier Scale						
1	Cover UG-53/U		1660-287732480 2Z3359-53				
1	Choke Cover UG-54/U		1660-287732485 2Z3359-54				

SLOTTED LINE IM-28/U

and monitored by the Wright Air Development Center, ARDC - Carl L.
Frederick and Associates, Bethesda, Maryland - Multilithed in U.S.A.



UNCTIONAL DESCRIPTION:

A portable, general purpose, slotted line, used in investigating the field distribuion along a transmission line. It is used in organizational, field, and depot testing f waveguide systems and components.

ELATIONSHIP TO OTHER EQUIPMENT:

Part of Radar Test Set AN/UPM-24.

Equipment required but not supplied: One RF Probe MX-1019/U and one amplier with indicator.

LECTROMECHANICAL DESCRIPTION:

ircuit Information: A waveguide is employed to attach this slotted line to the output of the equipment under test. An RF probe picks up energy from the standing wave present in the slotted line and transmits it to a crystal or a bolometer. The detected signal is then fed to a volt standing wave ratio indicator. Observations are made all along the slotted line until a pattern of the standing wave is made.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Substitute Standard		
STOCK NOS.	7CAC-439744		3F2732-28
PROCUREM'T INFO.: USAF Spec. 7526 14 Mar. 1949; USAF Dwg. No. 48D55645(latest issue)			
PROCUREM'T COG.: USAF		DESIGN COG.:	USAF, Rome
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	6. 2. 1

SLOTTED LINE IM-28/U

ELECTROMECHANICAL DESCRIPTION: (Continued)

By means of the standing wave information received, standing wave ratio and impedance of the system can be calculated.

Power Supply: None required.
Frequency Range: 1120 to 1700 megacycles per second.
Residual Volt Standing Wave Ratio: Less than 1.05 with probe at maximum insertion.
Slope: Negligible.
Leakage: Negligible.
Vernier Scale Mark: 22 to 54 centimeters.
Accuracy: ±0.01 centimeters.

MANUFACTURERS' OR CONTRACTORS' DATA:

Nichols Products Company, Inc., 325 West Main Street, Moorestown, New Jersey. USAF Contracts AF 33(038)-14405 dated 22 June 1950, AF 33(038)-20828 dated 15 February 1951, AF 33(038)-25089.

Press Wireless Manufacturing Company, Inc., 25 Prospect Avenue, West Newton 65, Massachusetts. USAF Contract AF 33(038)-16362 dated 12 October 1950. Approximate Cost per Unit, $350.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

AN 16-35IM28-2
AN 16-35IM28-4

SHIPPING DATA:

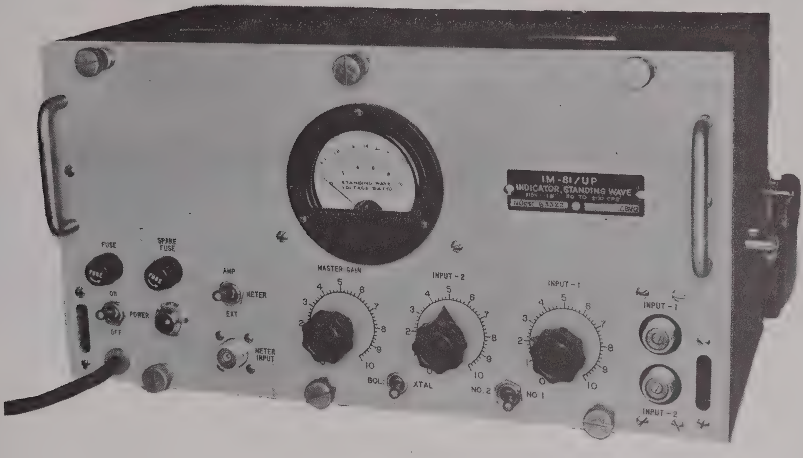
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

SLOTTED LINE IM-28/U

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Slotted Line IM-28/U Including:	Aluminum	7CAC-439744 3F2732-28	30	8-3/4	8-1/4	38
1	Slotted Section of 6-1/2" x 3-1/2" ID waveguide with worm-driven traveling carriage for test probe						
1	Vernier Scale						
2	Flange UG-418/U						

STANDING WAVE INDICATOR IM-81/UP



FUNCTIONAL DESCRIPTION:

A portable general purpose test set which is used to measure the standing wave ratio of the RF voltage within a waveguide system with a source of pulsed radio frequency power.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The indicator consists of a high gain audio amplifier whose output drives a copper oxide rectifier-type meter which is calibrated in voltage standing wave ratio. A radio frequency probe picks up the output from the slotted line and transmits it to a bolometer. The bolometer output is amplified, rectified, and supplied to a meter. The meter is calibrated to read directly the voltage standing wave ratio and is located in the front panel of the indicator. When the output from the bolometer is too low for satisfactory response a crystal rectifier may be substituted for the bolometer.

Power Supply: 115 volts, AC, 50 to 800 cycles per second, single phase, 35 watts.

Pulse Rate Frequency: 400 to 3500 cycles per second.

Input Impedance: 250 ohms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Tentative Standard		
STOCK NOS.	7CAC-439742-2	F16-I-54656-1023	
PROCUREM'T INFO.:			
PROCUREM'T COG.: USN		DESIGN COG.: USN, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.1	
	- Electronics Test Equipment -		IM-81/UP

s project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

STANDING WAVE INDICATOR IM-81/UP

ELECTROMECHANICAL DESCRIPTION: (Continued)

Voltage Standing Wave Ratio: 1:1 to 4:1.

Variation in Slope: Approximately 1% in VSWR reading.

Calibration Accuracy: 3% to 5%.

Sensitivity: 15 microvolts full scale meter reading for frequency range of 500 to 2000 cycles per second.

20 microvolts full scale meter reading for frequencies of 400 and 4000 cycles per second.

Meter Scale: 0 to 10 volts.

MANUFACTURERS' OR CONTRACTORS' DATA:

Trad Television Corporation, Asbury Park, New York; Contract Nos. NObsr-52707 and NObsr-63322, dated 22 June 1951, Trad Dwg. No. 106-D-80 and 134-D-1.

TUBE COMPLEMENT:

2 JAN-6SJ7, 1 JAN-6V6, 1 JAN-6H6, 1 JAN-6X5GT.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 91722 (Instruction Book).

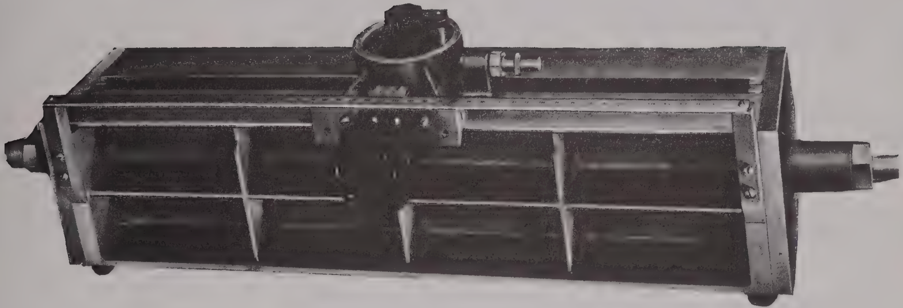
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Standing Wave Indicator IM-81/UP	1.73	12	20	12-3/4	48

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Standing Wave Indicator IM-81/UP	Metal	7CAC-439742-2 F16-I-54656-1023	8-7/8	16-9/16	8-11/16	36

SLOTTED LINE IM-92/U



'UNCTIONAL DESCRIPTION:

A portable, general purpose equipment used to investigate the standing-wave
atio of radio frequency signals. The instrument is used with a standing-wave in-
icator to determine the impedance of a load under test by means of the ratio be-
ween the incident and the reflected waves. The detected output of the slotted line
s applied to an associated standing-wave indicator. The slotted line is calibrated
n millimeters and centimeters.

ELATIONSHIP TO OTHER EQUIPMENT:

The IM-92/U is similar to Slotted Line Hewlett-Packard 805A.

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The slotted line consists basically of two parallel planes, a rigid central conductor and a probe assembly. The probe is moved from one end of the slotted line to the other by a rack and pinion arrangement which employs a vernier for indicating probe position. Means are provided to adjust the

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
OCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.: Army	DESIGN COG.: Army, SCEL		
I. I. N.:	FUNCTIONAL CLASS. NO.: 6.2.1		

SLOTTED LINE IM-92/U

ELECTROMECHANICAL DESCRIPTION: (Continued)
penetration depth of the probe into the slotted line.

Power Supply: None.

Frequency Range: 500 to 4000 megacycles per second (minimum frequency determined by usable length of 14. 5 inches).

Characteristic Impedance: 50 ohms.

Residual Standing-Wave Ratio: 1. 04.

Minimum Slotted Line Reading: 0. 1 millimeter.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, $475. 00.

TUBE COMPLEMENT:

1 1N21B (Crystal).

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

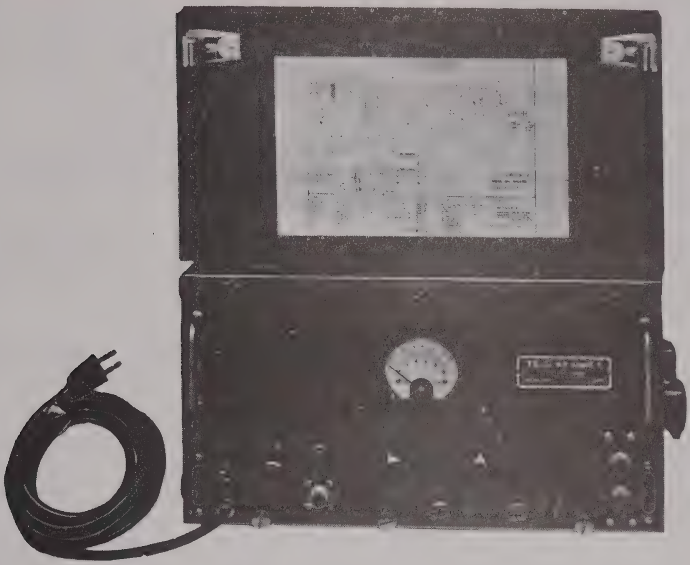
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Slotted Line IM-92/U					

SLOTTED LINE IM-92/U

QUIPMENT SUPPLIED:

uant. Per q'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Slotted Line Hewlett-Packard 805A						33
1	Carrying Case	metal		9-1/4	29	8-1/4	
1	Shorting Plug Hewlett-Packard 803A-76G						
1	Shorting Jack Hewlett-Packard 8A-76A						
1	Crystal Adapter Hewlett-Packard 8A-76E						
	Crystal Detector 1N21B						

STANDING-WAVE INDICATOR TS-12/AP



UNCTIONAL DESCRIPTION:

A portable, compact standing-wave indicator designed for measuring the stand-g-wave ratio of plumbing, T/R and R/T boxes, crystal mixers, and antennae of arious airborne radar equipment. Also used in conjunction with a source of pulsed adio frequency power for extensive bench testing of radars. Standing-wave voltage atios are read directly from an output meter calibrated in voltage standing-wave atio (VSWR) when used with a square-law pickup probe.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ower Supply: 115 volts alternating current, single phase, 60 to 800 cycles per second, 35 watts.

requency Range: 9305 to 9445 megacycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Standard		
TOCK NOS.	7CAC-439744-5	F16-Q-303010-100	3F4325-12
ROCUREM'T INFO.:			
ROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.1	
	- Electronics Test Equipment -		TS-12/AP

roject was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A

STANDING-WAVE INDICATOR TS-12/AP

ELECTROMECHANICAL DESCRIPTION: (Continued)

Pulse Rate Frequency: 400 to 3500 cycles per second.
Accuracy: Approximately ±3%.
Sensitivity: 15 microvolts minimum.
Input Impedance: Square-law pickup to 50 ohms.
Temperature Range: 0° to 120° F.

MANUFACTURERS' OR CONTRACTORS' DATA:

Presto Recording Company, Paramus, New Jersey; Contract No. NO-as-414
19 February 1944; Approximate Cost per Unit, $397.00.

Electro Impulse Laboratory, Eatontown, New Jersey; Contract No. AF-10066
10 February 1950; Approximate Cost per Unit, $388.00.

TUBE COMPLEMENT:

2 JAN-6SJ7, 1 JAN-6V6GT, 1 JAN-6H6, 1 JAN-6X5GT, 1 JAN-1N21A or -1N2
(crystal rectifier).

REFERENCE DATA AND LITERATURE:

AN 16-35TS12-3 (Operating Maintenance Instructions).
TO 16-35TS12-2 (Maintenance Instructions).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	
1	Amplifier Unit (Unit 1)	0.80	17	9	9	36
1	Accessories Case (Unit 2)	1.34	15	14	11	24

STANDING-WAVE INDICATOR TS-12/AP

QUIPMENT SUPPLIED:

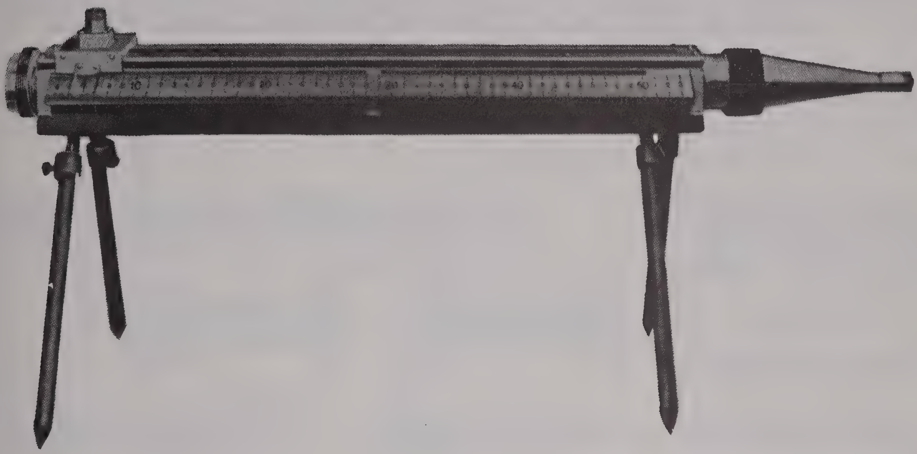
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Standing-Wave Indicator TS-12/AP (Including)		7CAC-439744-5 F-16-Q-303010-100 3F4325-12				60
1	Amplifier Unit (Unit 1)		3F4325-12. 1	9	16-5/8	8-7/8	36
1	Accessories Case (Unit 2) Including:		7CAC-801316-2 3F4325-12. 2	9	11-5/8	7-3/8	16. 5
1	Waveguide to Waveguide Adapter, CG-90/U		R16-AN-CG-90/W 2Z163-90 N/SL	1/2	1	. 05	0. 688
2	Waveguide Coax Adapter UG-81/U		R16-A-407 2Z308-81				0. 438 ea.
1	Radio Frequency Cable, CG-92/U		7CAC-170265-4656 R16-AN-CG-92/U 1F430-92. 96	96 long			1. 063
1	Synchronizing Cable, CG-91/U		7CAC-170265-523 R16-AN-CG-91/U 1F430-91	72 long			0. 75
1	Synchronizing Cable, CG-89/U		1600-132336091 R16-AN-CG-89/U 1F430-89	42			0. 5
1	Waveguide to Coax Adapter UG-79/U		R16-AN-UG-79/U 2Z308-79 N/SL				0. 25
1	Slotted Section CG-87/U		2Z8562-87 N/SL				1. 313
1	Probe Assembly MX-158/U		7CSQ-43-5388 R16-AN-MX-158/U 3F3989-158				0. 563
1	Terminating Section CG-88/U		7CPV-43-5385 R16-AN-CG-88/U 2Z10006-88				0. 5

STANDING-WAVE INDICATOR TS-12/AP

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
2	Large to small Waveguide Adapters, UG-80/U		8850-101650 2Z308-80 N/SL				0.5
2	Support Blocks						
6	Spare Crystals 1N21		3300-234137000 2J1N21				
2	Screw Drivers						
4	Clamps			1			
2	Spare Probe Conductors						
1	Box Operating Spares		3F4325-12/MP N/SL				
1	Carrying Case						
1	Instruction Book, TO 16-35TS12-2		3F4325-12/B1				
1	Hardware Kit		6L80083 N/SL				

STANDING-WAVE METER TS-130/UP
(INDICATOR, STANDING-WAVE, TS-130/UP)



JNCTIONAL DESCRIPTION:

A portable, radio frequency standing-wave meter designed to measure the stand- wave ratio of radar systems employing 1-5/8 inch coaxial radio frequency lines. A meter stick, located along the slotted line, is used in determining the nodal nts for impedance calculations. Standing-wave ratio is then determined by for- la.

ELATIONSHIP TO OTHER EQUIPMENT:

Standing-Wave Meter TS-130/UP is similar to TS-130A/UP except that TS-130A/UP usable with JAN-type 1-5/8 inch coaxial line as well as with the Bell Telephone boratories type; two tuned radio frequency probes have replaced the untuned probe TS-130/UP; several mechanical details have been modified to improve field op- ations; and a transit case has been provided for the TS-130A/UP.

ECTROMECHANICAL DESCRIPTION:

wer Supply: None.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Limited Standard		
OCK NOS.	1690-327879484		3F4325-130
ROCUREM'T INFO.: Spec. OS-3087, Dwg. No. BX-430473 (Navy)			
ROCUREM'T COG.: USAF		DESIGN COG.: USAF, Rome	
I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.1	
- Electronics Test Equipment -			TS-130/UP

roject was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

STANDING-WAVE METER TS-130/UP
(INDICATOR, STANDING-WAVE, TS-130/UP)

ELECTROMECHANICAL DESCRIPTION: (Continued)
Frequency Range, Input: 400 to 3000 megacycles per second.
Input Impedance: 53.5 ohms.
Output Impedance: 53.5 ohms.
Temperature Range: -40° F. to +122° F.

MANUFACTURERS' OR CONTRACTORS' DATA:

Western Electric Company, New York, New York; Contract Nos. NOrd-10095 a NOrd-3456; Approximate Cost per Unit, $2595.10, 1949; W.E. Co. Code No.X-6616 Designed by Bell Telephone Laboratories.

TUBE COMPLEMENT:

1 JAN-1N21B (Crystal).

REFERENCE DATA AND LITERATURE:

TM 11-1084 (Instruction Manual).
TO 16-35TS130-3 (Maintenance Instructions).

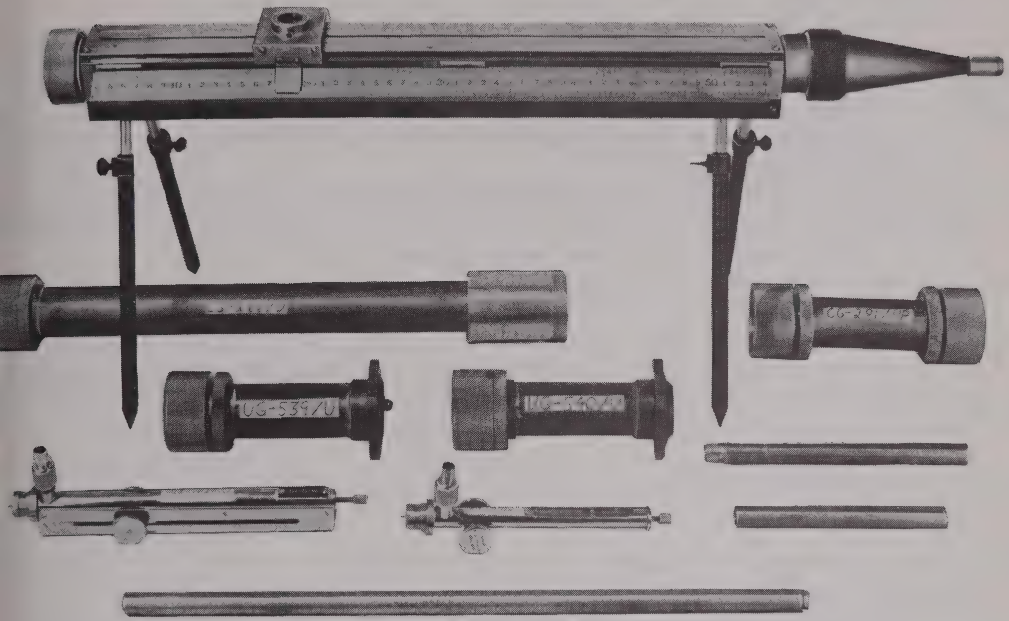
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weigh (Lbs.
				H	W	D	
1	Standing-Wave Meter TS-130/UP		1690-327879484 3F4325-130	3.75	3.5	29.50	13.5
1	Transmission Line Calculator						

STANDING-WAVE METER TS-130A/UP
(INDICATOR, STANDING-WAVE, TS-130A/UP)



UNCTIONAL DESCRIPTION:

A portable, radio frequency standing-wave meter designed to measure the stand-
wave ratio of radar systems employing 1-5/8 inch coaxial radio frequency lines.
A meter stick, located along the slotted line, is used in determining the nodal
nts for impedance calculations. Standing-wave ratio is then determined by for-
la.

ELATIONSHIP TO OTHER EQUIPMENT:

Standing-Wave Meter TS-130A/UP is similar to TS-130/UP except that TS-130A/UP
usable with JAN-type 1-5/8 inch coaxial line as well as with the Bell Telephone
boratories type; two tuned radio frequency probes have replaced the untuned probe
TS-130/UP; several mechanical details have been modified to improve field op-
ations; and a transit case has been provided for the TS-130A/UP.

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Standard		
'OCK NOS.	7CAC-439745		3F4325-130A
ROCUREM'T INFO.:	USAF Exhibit No. WLENG-219, MIL-S 4169, 14 August 1950.		
ROCUREM'T COG.:	USAF	DESIGN COG.: USAF, Rome	
I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.1	
	- Electronics Test Equipment -		TS-130A/UP

oject was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

STANDING-WAVE METER TS-130A/UP (INDICATOR, STANDING-WAVE, TS-130A/UP)

ELECTROMECHANICAL DESCRIPTION:

Power Supply: None.

Frequency Range, Input: 400 to 3000 megacycles per second.

Input Impedance: 53.5 ohms.

Output Impedance: 53.5 ohms.

VSWR: Less than 1.10, with maximum probe insertion (looking into either end o impedance meter).

Variation in Slope: Less than 2% in voltage standing-wave ratio reading.

Slot Leakage: Less than amount necessary to cause a 1% variation in voltage standing-wave ratio reading at a voltage standing-wave ratio of 1.05.

Temperature Range: -40° F. to +122° F.

MANUFACTURERS' OR CONTRACTORS' DATA:

Central Research Laboratories, Incorporated, Red Wing, Minnesota, Productio Contract No. AF 33(038)29508, dated 16 June 1951, and Production Contract No. A 33(038)18863, dated 10 January 1951, Approximate Cost per Unit, $240.00.

TUBE COMPLEMENT:

1 JAN-1N21B (Crystal).

REFERENCE DATA AND LITERATURE:

TO 16-35TS130-12 (Service Instructions).

AN 16-35TS130-14 (Illustrated Parts Breakdown).

SHIPPING DATA:

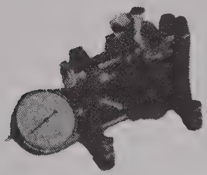
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	
1	Standing-Wave Meter, TS-130A/UP Complete					

STANDING-WAVE METER TS-130A/UP
(INDICATOR, STANDING-WAVE, TS-130A/UP)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Standing-Wave Meter, TS-130A/UP Including:		7CAC-439745 3F4325-130A				
1	Impedance Meter IM-34/U			3	2.5	29	12
1	Radio Frequency Probe MX-1019/U		7CAC-657350 3F3703-3	8	2.75	1.375	0.5
1	Radio Frequency Probe MX-1020/U		7CAC-657650	10	3	1.5	1.5
1	Connector Adapter UG-539/U			7	2.5 dia.		2.25
1	Cord CG-266/U		7CAC-472685 1F430-266.18.5	18.5 long			4
1	Cord CG-281/UP		7CAC-170265-57 3F6015-281	7 long	1 dia.		2.5
1	Transmission Line Calculator						
1	Transit Case CY-791/U Equipped with Crystal Holder for 3 Spare Crystals	Metal		6	18	33	20
1	Cord CG-426/U			7 long	1 dia.		

METER, IMPEDANCE
Part No. 320
(Sperry Gyroscope Company)



FUNCTIONAL DESCRIPTION:

This instrument is used for the measurement of impedance in the microwave spectrum. Determination may be made of both the amplitude and the phase of standing waves in transmission lines. The impedance meter includes a detector thus permitting its use as a monitor or detector of microwave energy.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The impedance meter consists of a section of precision formed and slotted transmission line into which an adjustable probe projects. A knurled knob located at the top of the probe section controls the depth of the probe. The probe transmits microwave energy to a detector and uhf output fitting.

The probe assembly is mounted on a carriage which permits its position to be adjusted along the length of the transmission line. A precision dial indicates its position along the line.

Transmission line section is terminated by standard AN flanges.

Frequency Range: 18,000 to 26,500 megacycles per second.
Crystal Type: 1N26.
Transmission Line: AN type RG-53/U Waveguide.
Connectors: Input and Output - UG-425/U.
Probe Carriage Travel: 3.5 centimeter.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.1	
	- Electronics Test Equipment -		Sperry 320

is project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

METER, IMPEDANCE
Part No. 320
(Sperry Gyroscope Company)

MANUFACTURERS' OR CONTRACTORS' DATA:

Sperry Gyroscope Company, Division of the Sperry-Rand Corporation, Grea Neck, Long Island, New York.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Sperry Gyroscope Company "Microline Instruments."

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Meter, Impedance (Sperry No. 320)	2.21	17	17	13	11-1/2

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weigh (Lbs.)
				H	W	D	
1	Meter, Impedance (Sperry No. 320)			6	6-3/8	4-1/2	7

STANDING-WAVE INDICATOR AN/UPM-108

FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment designed for use with slotted lines and letector mounts for measurements of standing-wave ratio. In addition the instrument may also be used as a null indicator for bridge measurements. Test results are indicated on a square-law meter with indications in terms of standing-wave ratio or decibels.

RELATIONSHIP TO OTHER EQUIPMENT:

The instrument is similar to Standing-Wave Indicator Hewlett-Packard 415B. AN/UPM-108 is the overall nomenclature for IM-157/U.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The instrument is essentially comprised of a high-gain ampifier incorporating an output meter.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.: Army		DESIGN COG.:	Army, SESA
I.I.N.:		FUNCTIONAL CLASS. NO.:	6.2.2

STANDING-WAVE INDICATOR AN/UPM-108

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 115 or 230 volts ±10%, AC, 50 to 60 cycles per second, 60 watts.
Operating Frequency: 1000 cycles per second ±2%.
Sensitivity: 0.1 microvolt across a 200 ohm level for full scale deflection.
Noise Level: Less than 0.03 microfarads referred to an input operated from
200 ohm resistor.
Amplifier Q: 25 ±5.
Calibration: For use with square-law detector; 0 to 60 decibels covered in 6 range
Accuracy ±0.1 decibel per 10 decibel steps.
Meter Calibration: 1 to 4 and 3 to 10 standing-wave ratio, 1 to 1.3 expanded stan
ing-wave ratio; 0 to 10 decibels, 0 to 2 expanded decibels.
Gain Control: Adjusts meter to a convenient reference level; range approximatel
30 decibels.
Input: Biased 200-ohm termination for bolometer; unbiased 200-ohm terminatio
for crystal, 200,000 ohms for crystal rectifier used as a null detector.
Input Bias Provided: 8.4 milliamps for bolometer or 0.01 amp fuse; 4.3 milli
amps for low-current bolometer.
Output Jack: Connection for recorder having a full scale deflection of 1 milliam
and an internal resistance of 1500 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, $200.00.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

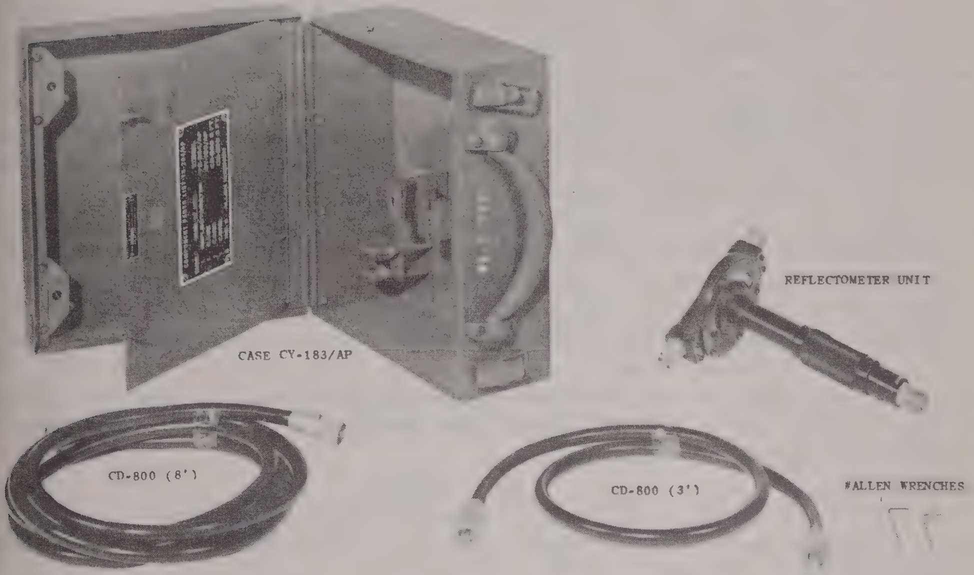
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	
1	Standing-Wave Indicator AN/ UPM-108 and accessories					35

STANDING-WAVE INDICATOR AN/UPM-108

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Standing-Wave Indicator AN/UPM-108			11-1/4	7-1/4	14	20
1	AC Cable Assembly						
1	Cable Assembly						

REFLECTOMETER TS-204/AP
(TEST SET, SUBASSEMBLY, TS-204/AP)



FUNCTIONAL DESCRIPTION:

The reflectometer is a special purpose test equipment used for making tests of Antenna System AS-62/APS-13 or Antenna Assembly AS-151/APS-13 (Part of Radio Set AN/APS-13) installed in an airplane. It will not complete the test, but when used with Test Set TS-184A/AP and Transmitter-Receiver RT-34/APS-13 it determines how much the impedance of the antenna and antenna transmission line differs from 72 ohms. The reflectometer measures the ratio (in decibels) of the reflected voltage to the incident voltage (reflection coefficient) or the ratio of the reflected power to the incident power. This equipment is used for measuring reflection coefficient of the antenna installation only. For test of system sensitivity, tuning, etc., refer to Handbook of Maintenance Instructions for Radio Set AN/APS-13 and Handbook of Maintenance Instructions for Test Set TS-184A/AP.

RELATIONSHIP TO OTHER EQUIPMENT:

Equipment required but not supplied: Test Set TS-184A/AP; Dummy Load MX-538 is also needed to replace the antenna when testing the Reflectometer.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-439743	R16-AN-TS-204/AP	3F4325-204
PROCUREM'T INFO.: USAF Spec. No. R7109			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.2	
	- Electronics Test Equipment -		TS-204/AP

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

REFLECTOMETER TS-204/AP
(TEST SET, SUBASSEMBLY, TS 204/AP)

ELECTROMECHANICAL DESCRIPTION:

The reflectometer consists of a short section of coaxial line fitted with a socke marked "ANT" at one end and another socket marked "XMTR" at the other en This acts as an extension of the antenna transmission line. A branch tube, associated with the selector dial, housing a pick-up loop and its matching networ is mounted on the coaxial section to complete the reflectometer. The pick-u loop is made of thin beryllium copper ribbon 1/8 inch wide and located inside th coaxial section so that a small capacity and inductance coupling exists betwee the center conductor of the main line and the loop.

When the selector dial is at the position marked "INCIDENT", the loop is oriente so that there is an effective cancellation of the total coupling for the reflecte wave and the radio frequency output from the branch tube is proportional to th incident wave only. When the selector dial is turned to "REFLECTED", th incident wave coupling is cancelled and the radio frequency output from the branc tube is proportional to the reflected wave only.

The reflection coefficient can then be computed from the ratio of these two reading

Frequency Range: 410 to 420 megacycles per second.

Impedance: 52 ohms (Input and Output).

MANUFACTURERS' OR CONTRACTORS' DATA:

RCA, Rockerfeller Plaza, New York, New York; Order No. 738-DAY-44; 29 Mar 1945; Approximate Cost per Unit, $77.81.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-35TS204-3 (Handbook of Maintenance Instructions).

SHIPPING DATA:

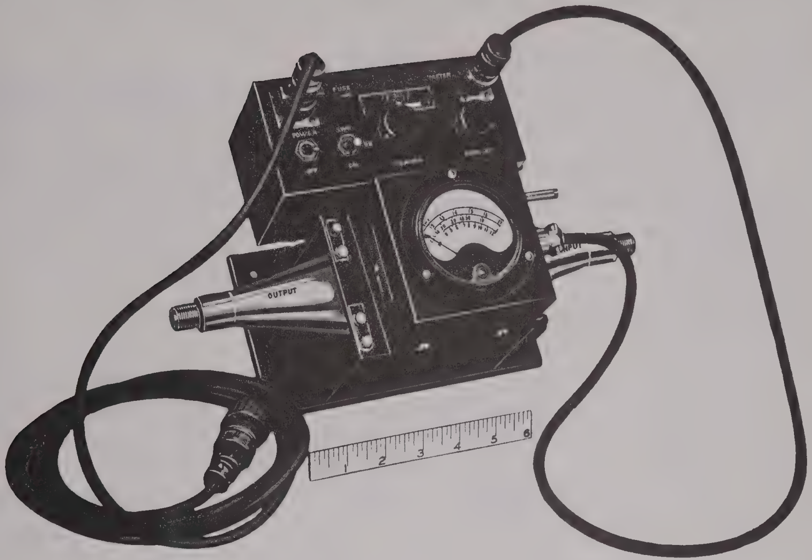
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	
1	Reflectometer TS-204/AP with accessories (Shelf Package - Water Resistant)	1.02	14	14	9	12

REFLECTOMETER TS-204/AP
(TEST SET, SUBASSEMBLY, TS-204/AP)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Reflectometer TS-204/AP		7CAC-439743 R16-AN-TS-204/AP 3F4325-204	8	5-5/8	3-1/4	9
1	Case CY-183/AP	Aluminum	1690-328630080 3F2529-183	11-1/2	10-1/8	5-1/2	
1	Cord CD-800		1600-321855351 1F430-107.96	96 long			
1	Cord CD-800		1600-132336113 1F430-107.36	36 long			
2	Allen Wrenches No. 4		7900-859460 6R55499				
1	Instruction Book		 6D9810-204				

REFLECTOMETER TS-377/U



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used to determine the degree of matching between the radio frequency transmission line of a Radio Transmitter T-123/ART-22 and its antenna. The test set accomplishes this by measuring the voltage standing-wave ratio and relative power output in the radio frequency transmission line between the transmitter and its antenna. The meter is calibrated in decibels and standing-wave ratio.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The instrument consists of a bi-directional coupler, a detector, a meter, and associated circuits. The signal to be measured is picked up by the directive element of the bi-directional coupler. The output of the directive element is fed to a detector circuit. The signal is rectified and amplified in the detector circuit and is applied to an indicating meter. Means are

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.		R16AN-TS-377U(ASO)	
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuAer	
F.I.I.N.: 6625-179-0092		FUNCTIONAL CLASS. NO.: 6.2.2	
	- Electronics Test Equipment -		TS-377/U

REFLECTOMETER TS-377/U

ELECTROMECHANICAL DESCRIPTION: (Continued)
provided for reversing the directive element of the bi-directional coupler by 180 degrees.

Power Supply: 28 + 2 - 4 volts DC, 0. 16 amp.

Frequency Range: 275 to 330 megacycles per second, average transmitter powe output 5 watts; 250 to 365 megacycles per second, average transmitter powe output 10 watts.

Accuracy (Standing-Wave Ratio Measurements): 1. 2 between 275 to 330 megacycles per second, 1. 3 between 250 and 365 megacycles per second.

Accuracy (Power Measurement): ±0. 5 decibel between 275 to 330 megacycles per second, ±1 decibel between 250 and 365 megacycles per second.

Meter Scale Calibration:
Voltage Standing-Wave Ratio: 1 to 10 in 2 ranges.
Decibels: 0 to 12.

Error (Caused by replacing tube V101): Less than 0. 05 for voltage standing-wave ratio measurements, less than ±2. 5 decibels for power measurements.

Error Caused By Line Voltage Variation: Less than 0. 05 for voltage standing-wave ratio measurements, less than 0. 5 decibel for power measurements.

Reflections: 1. 2 voltage standing-wave ratio introduced by insertion of the bi-directional coupler in place of bi-female junction connector.

MANUFACTURERS' OR CONTRACTORS' DATA:
Approximate Cost per Unit, $590. 00.

TUBE COMPLEMENT:
2 9002.

REFERENCE DATA AND LITERATURE:
NavAer 16-5S-512.

SHIPPING DATA:

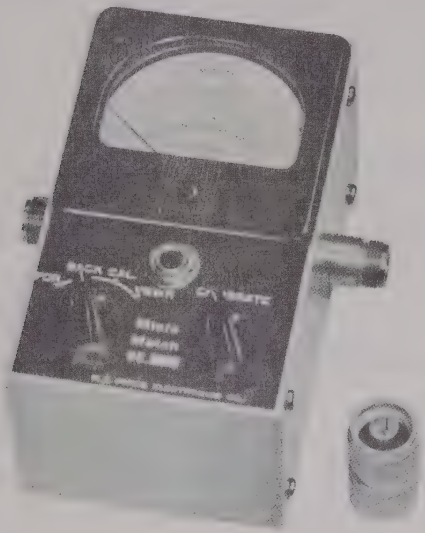
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.)
			H	W	D	
	Reflectometer TS-377/U					

REFLECTOMETER TS-377/U

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Reflectometer TS-377/U	Steel		14-1/4	8-3/8	7-5/8	21
1	Power Cable			120 long			
1	RF Cable RG-9/U			48 long			
1	Bi-Female Junction Connector			2-3/16	5/8 dia.		

REFLECTOMETER
MODEL NO. MM706 "MICROMATCH"
(M.C.Jones Electronics Company)



UNCTIONAL DESCRIPTION:

A portable, general purpose test instrument designed to measure radio frequency ower and standing wave ratio when testing radio transmitting equipment. Selector witches enable the meter to read directly in terms of incident radio frequency power, eflected radio frequency power, net radio frequency power to the load and the voltage tanding wave ratio of the load. The meter is calibrated in watts and standing wave atio. A jack outlet connected to either headphones or an AC voltmeter provides a eans for monitoring the output modulation of amplitude modulating transmitters.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to VSWR Meter Model No. MM707, M. C. Jones Electronics Company, ex- ept that Model No. MM706 has a more limited power range. Used to test Radio ransmitting Set AN/ART-28.

LECTROMECHANICAL DESCRIPTION:

ircuit Information: Consists of a coupler unit which converts radio frequency power

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-439743-25		
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.2	
	- Electronics Test Equipment -		Jones MM706

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

REFLECTOMETER
MODEL NO. MM706 "MICROMATCH"
(M.C. Jones Electronics Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)
into DC voltage which is read on the meter of the indicating circuit. Two crysta units are used to operate the meter.

Power Supply: None.

Frequency Range: 30 to 2000 megacycles per second.

Power Range: 0 to 400 watts.

Impedance: 51.5 ohms.

Reflection Coefficient: Negligible.

Connectors: Type N to accept UG-21/U attached to RG-8/U or RG-9/U Cable (als available with ultra-high frequency and with HN type connectors).

Accuracy: For radio frequency power measurements: ±5% of full scale.
For voltage standing wave ratio: ±10%.

MANUFACTURERS' OR CONTRACTORS' DATA:
M. C. Jones Electronics Company, 96 North Main Street, Bristol, Connecticu
Approximate Cost per Unit, $110.00, 1 December 1950.

TUBE COMPLEMENT:
2 JAN-1N21 (Crystal).

REFERENCE DATA AND LITERATURE:
Manufacturer's Catalog Volume No. 1 Bulletin No. 10.

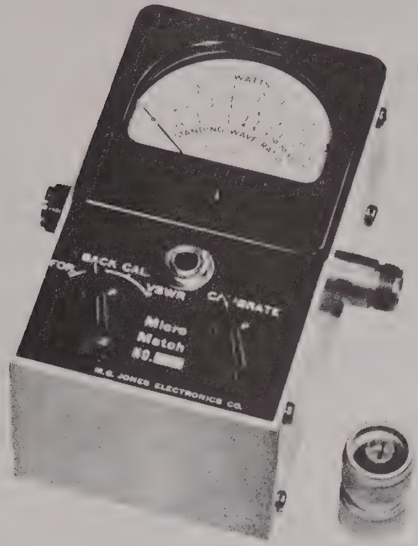
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock (USAF) Numbers (Navy) (Army)	Overall Dimensions (inches)			Weigh (Lbs.
				H	W	D	
1	Reflectometer Model No. MM706 Micromatch	Wood	7CAC-439743-25	3-1/8	5-1/4	3-3/8	2
1	RF Adapter UG-57B/U	Brass silver plated	2Z7390-57B	1-1/2 long	13/16 dia.		

REFLECTOMETER
MODEL NO. MM707 "MICROMATCH"
(M.C. Jones Electronics Company)



JNCTIONAL DESCRIPTION:

A portable, general purpose test instrument designed to measure radio frequency wer and standing wave ratio when testing radio transmitting equipment. Selector itches enable the meter to read directly in terms of incident radio frequency power, flected radio frequency power, net radio frequency power to the load and voltage anding wave ratio of the load. The meter is calibrated in watts and standing wave tio. A jack outlet connected to either headphones or an AC voltmeter provides a eans for monitoring the output modulation of amplitude modulating transmitters.

ELATIONSHIP TO OTHER EQUIPMENT:

Similar to Reflectometer, Model No. MM706, M. C. Jones Electronics Company, cept that Model No. MM707 has an extended power range. Used to test Radio Transtting Set AN/AXT-10.

LECTROMECHANICAL DESCRIPTION:

rcuit Information: Consists of a coupler unit which converts radio frequency power

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.	7CAC-439743-4		
ROCUREM'T INFO.:			
ROCUREM'T COG.:		DESIGN COG.: Commercial	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.2.2	
	- Electronics Test Equipment -		Model No. MM707

roject was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

REFLECTOMETER
MODEL NO. MM707 "MICROMATCH"
(M. C. Jones Electronics Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

into DC voltage which is read on the meter of the indicating circuit. Two crystal units are used to operate the meter.

Power Supply: None.

Frequency Range: 30 to 2000 megacycles per second.

Power Range: 0 to 1200 watts.

Impedance: 51.5 ohms.

Reflection Coefficient: Negligible.

Connectors: Type N to accept UG-21/U attached to RG-8/U or RG-9/U Cable (also available with ultra-high frequency and with HN type connectors).

Accuracy: For radio frequency power measurements: ±5% of full scale.
For voltage standing wave ratio: ±10%.

MANUFACTURERS' OR CONTRACTORS' DATA:

M. C. Jones Electronics Company, 96 North Main Street, Bristol, Connecticut

Approximate Cost per Unit, $110.00, 1 December 1950.

TUBE COMPLEMENT:

2 JAN-1N21 (Crystal).

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog Volume No. 1 Bulletin No. 10.

SHIPPING DATA:

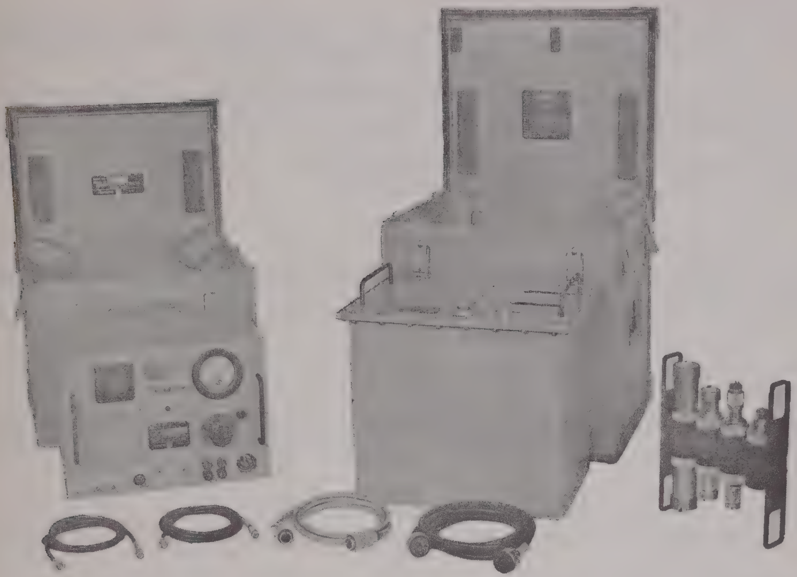
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	VSWR Meter Model No. MM707 Micromatch	Wood	7CAC-439743-4	3-1/8	5-1/4	3-3/8	2
1	RF Adapter UG-57B/U	Brass silver plated	2Z7390-57B	1-1/2 long	13/16 dia.		

6.3 WIRE AND CABLE TESTING EQUIPMENT

ELECTRICAL CABLE TEST SET AN/UPM-16



UNCTIONAL DESCRIPTION:

A portable, depot, general purpose test set, used to measure corona starting d extinction voltages on pulse cable assemblies. Corona is indicated on a cathode y tube which must be used with this set. Voltage is indicated on a voltmeter dial.

ELATIONSHIP TO OTHER EQUIPMENT:

This set was formerly designated Cable Corona Test Set TS-526(XA)/AP.

LECTROMECHANICAL DESCRIPTION:

rcuit Information: A variac varies input to a power transformer primary, thereby varying its high voltage secondary output. The pulse cable assembly to be tested is mated by the applicable adapter connector to the output high voltage connectors of the transformer secondary. An AC voltmeter connected across the transformer primary is calibrated in terms of secondary voltage. Observation of the cathode ray tube screen while increasing the output voltage will indicate at

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.	7CAC-801318-48		
ROCUREM'T INFO.: Spec. MIL-E-6397(USAF) dated 7 March 1951			
ROCUREM'T COG.: USAF		DESIGN COG.: USAF, ARL	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.3	
	- Electronics Test Equipment -		AN/UPM-16

roject was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

ELECTRICAL CABLE TEST SET AN/UPM-16

ELECTROMECHANICAL DESCRIPTION: (Continued)

what voltage corona starts. Observation while decreasing the output voltage wil indicate at what voltage corona stops.

Power Supply: 115 volts, ±10% AC, 50 to 60 cycles per second, single phase, 1 amperes.

Frequency Range: 150 kilocycles per second to 150 megacycles per second.

Calibrated Voltage Output Range: 0 to 20,000 volts, continuously adjustable.

Current Output Range: 37 milliamperes, maximum.

Cable Length to be Tested: 100 feet, maximum.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Tire and Rubber Company, 1708 Englewood Avenue, Akron, Ohio; Contract No. AF 33(604)-7647 (Subcontractor: Jackson Electric Company, Akron, Ohio

Approximate Cost per Unit, $1,574.81.

TUBE COMPLEMENT:

TS-526/UPM-16: 1 JAN-6X41, 1 JAN-OA3/VR75, 1 JAN-OB2, 2 JAN-5654 6AK5W, 1 JAN-6AK6, 2 JAN-6005/6AQ5, 1 JAN-5726/6A65W, 1 JAN-2BP1.

REFERENCE DATA AND LITERATURE:

Handbook of Instructions for Cable Corona Test Set TS-526(XA)/AP, 15 Marc 1949.

TO 16-30UPM16-1 (Operation and Service Instructions).
TO 16-30UPM16-3 (Overhaul Instructions).
TO 16-30UPM16-4 (Parts Breakdown).

SHIPPING DATA:

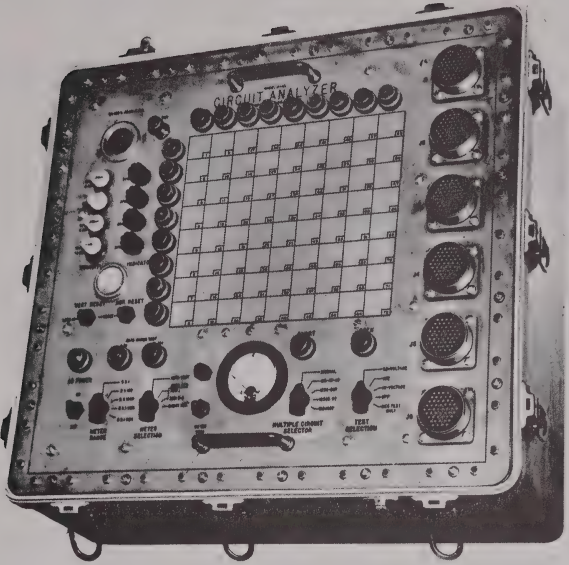
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weig Packe (Lbs
			H	W	D	
1	Power Transformer Unit TF-134/UPM-16	5.5	21-1/4	21	21-1/4	184
1	Control Unit and Cords	3.3	20-3/4	14-5/8	18-3/4	53
AN/UPM-16	- Electronics Test Equipment -					

ELECTRICAL CABLE TEST SET AN/UPM-16

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Electrical Cable Test Set AN/UPM-16 Including:		7CAC-801318-48	42	40	36	240
1	Cable Corona Tester TS-526/UPM-16			17-1/2	11-3/4	11-1/4	32
1	Power Transformer TF-134/UPM-16			19	17-1/2	12-3/4	142
1	Power Cable Assembly CX-1517/U			72 long			0.8
1	Case CY-877/UPM-16						
1	Case CY-878/UPM-16						
1	Adapter Connector UG-607/U						
1	Adapter Connector UG-608/U						
1	Adapter Connector UG-609/U						
1	Adapter Connector UG-610/U						
1	Adapter Connector UG-611/U						
2	Cable, Pickup CG-426/U			72 long			
1	Cord CX-337/U			120 long			

TEST SET, ELECTRICAL CABLE AN/USM-88



FUNCTIONAL DESCRIPTION:

A portable, general purpose, instrument designed to test complex inter connected circuits for improper connections, shorts, and low insulation resistance. The test set may also be used for testing relays, solenoids, actuators, resistors, and panel lamps. Tests are conducted at both high and low voltages, and faults are detected and identified by means of a matrix chart.

RELATIONSHIP TO OTHER EQUIPMENT:

The AN/USM-88 is similar to the DIT-MCO Model 144 NX.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set consists basically of telephone-type stepping switches and relays to automatically program an entire system of circuits; a panel matrix with panel lamps for locating and identifying faulty circuits; and a panel mounted multi-range ohmmeter used to measure the resistance of any

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.: MIL-T-945A			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.3	
	- Electronics Test Equipment -		AN/USM-88

TEST SET, ELECTRICAL CABLE AN/USM-88

ELECTROMECHANICAL DESCRIPTION: (Continued)

circuit determined faulty by the programing circuitry. Six panel connector are provided for adapter cables that must be provided for each type of equipment to be tested.

Power Supply: 95 to 130 volts, AC, 50 to 65 cycles per second, 100 watts.
Test Circuit Capacity: 144 circuits.
Reference System: Matrix type.
Low-Voltage Continuity Test:
  Direct Voltage: 28 volts (current limited to 1.0 amp).
  Resistance Range: Adjustable within limits.
Low-Voltage "Short" Test:
  Direct Voltage: 28 volts.
  Resistance Range: 0 to 1 megohm.
High-Voltage Continuity Test:
  Direct Voltage: 500 volts, (current limited to 1.0 milliamp).
High-Voltage Insulation-Leakage Test:
  Direct Voltage: 500 volts.
  Resistance Range: Fixed at values up to 200 megohms.
Ohmmeter Range (MIL-M-10304): 0 to 200 megohms in 5 ranges.

MANUFACTURERS' AND CONTRACTORS' DATA:

DIT-MCO, Incorporated, Electronics Division, 911 Broadway, Kansas City, Missouri.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

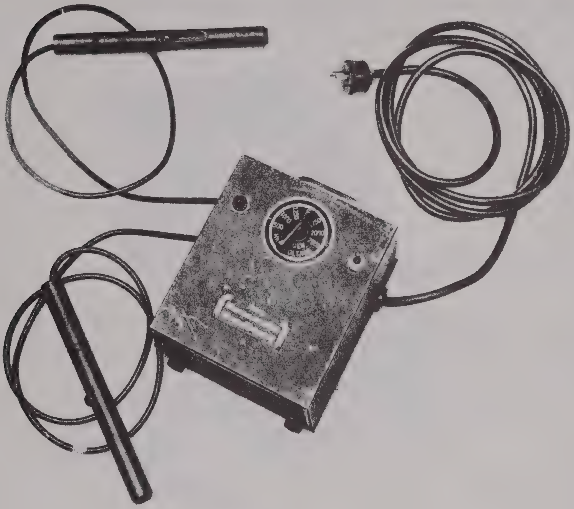
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	
	Test Set, Electrical Cable AN/USM-88					

TEST SET, ELECTRICAL CABLE AN/USM-88

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Set, Electrical Cable AN/USM-88			24	26	24	

TESTER, INSULATION BREAKDOWN
NO. 36/41-001B
(Ideal Industries, Incorporated)



FUNCTIONAL DESCRIPTION:

A portable, general purpose tester used to provide high voltages to test wire insulation resistance to breakdown.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The tester is a step-up transformer tapped in the secondary winding at seven points to provide the various output potentials. Desired output potentials are selected by means of a positive-locking, quick-make switch. An on-off switch and an indicator lamp are located in the primary winding. The transformer is embedded in a potting compound. Two test probes provided are permanently attached to the tester.

Power Supply: 115 volts, AC, 60 cycles per second.

Output: 500, 1000, 1250, 1500, 1750, 2000 or 2500 volts, AC, 60 cycles per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.			

PROCUREM'T INFO.:

PROCUREM'T COG.: Navy DESIGN COG.: Commercial

F.I.I.N.: FUNCTIONAL CLASS. NO.: 6.3

TESTER, INSULATION BREAKDOWN
NO. 36/41-001B
(Ideal Industries, Incorporated)

MANUFACTURERS' OR CONTRACTORS' DATA:

Ideal Industries, Incorporated, 5103 Park Avenue, Sycamore, Illinois.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

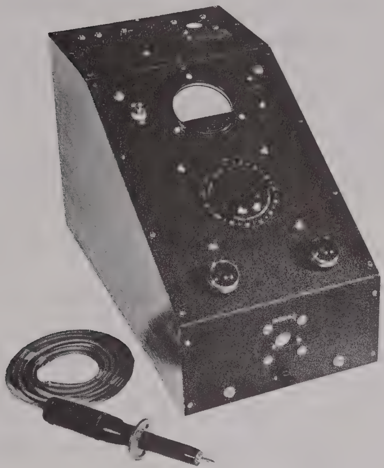
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Tester, Insulation Breakdown Ideal 36/41-001B	metal		10	7-1/2	5	8

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packe (Lbs.)
			H	W	D	
	Tester, Insulation Breakdown Ideal 36/41-001B					

VOLTAGE BREAKDOWN TESTER
MODEL P-2
(Industrial Instruments, Incorporated)



FUNCTIONAL DESCRIPTION:

A portable, general purpose self-contained unit used for testing the insulation of electrical wiring, potting compounds, transformer coils, and capacitors. The tester is used to determine whether a material or component can withstand a specified rated voltage, plus a specified excess voltage, for a limited time; and also to determine the breakdown voltage of component parts or material. The unit is essentially a source of high-potential alternating and direct voltages with associated controls and indicators. Test results are indicated by means of a meter, a calibrated dial, and a panel lamp.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit consists essentially of transformers, a half-wave rectifier, storage capacitors, a DC voltmeter, panel lights, a relay, and a

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.3	
- Electronics Test Equipment - Industrial P-2			

VOLTAGE BREAKDOWN TESTER
MODEL P-2
(Industrial Instruments, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

circuit breaker. A variable series resistance in the DC output is ganged mechanically with an autotransformer to increase the series resistance as the primary voltage of the high-voltage transformer is increased. This arrangement maintains the short-circuit current of the breakdown tester essentially constant at 5 milliamps DC. The relay indicates that AC voltage breakdown has occurred and is set at approximately 3 milliamps. DC voltage breakdown is indicated by the illumination of a green panel lamp. Interlock switches automatically cut off the power when the cabinet is opened. The tester is also protected by fuses.

Power Supply (External): 115 volts, AC, 50 to 60 cycles per second, single-phase.
Meter Range: 0 to 5000 volts.
Operating Range: 0 to 3000 volts rms; 0 to 4000 volts DC.
Maximum Current; 7 milliamps AC; 5 milliamps DC.
Meter Sensitivity: 1 milliamp for full-scale deflection.

MANUFACTURERS' OR CONTRACTORS' DATA:

Industrial Instruments, Inc., 89 Commerce Road, Cedar Grove, New Jersey; Approximate Cost per Unit, $200.00.

TUBE COMPLEMENT:

1 2X2 or 1 879.

REFERENCE DATA AND LITERATURE:

Manufacturer's Instructions 2719-D-1, A-5040.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Voltage Breakdown Tester Industrial P-2					32

VOLTAGE BREAKDOWN TESTER
MODEL P-2
(Industrial Instruments, Incorporated)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Voltage Breakdown Tester Industrial P-2	wood		15	8	10	29
1	Probe						

INSULATION TESTER
MODEL 1203
(Radio Frequency Laboratories, Incorporated)

FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment designed to automatically or manually test cable insulation on a GO-NO/GO basis. Output of the tester is indicated by a meter calibrated in kilovolts.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The tester consists basically of a magnetic voltage regulator, a variable voltage control, a high voltage power supply, a control relay, a motor and clutch assembly, a high voltage relay, a microammeter power supply, and a vacuum tube microammeter. The magnetic voltage regulator supplies power for the variable voltage control, the microammeter power supply, and the control relay. The variable voltage control contains an auto-transformer for varying the input to the high voltage power supply. A magnetic clutch

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 6.3	

INSULATION TESTER
MODEL 1203
(Radio Frequency Labortories, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

and motor, engaged during automatic operation, are coupled to the auto-transformer. Automatically operated switches engage the clutch when the test voltage has reached full scale potential and restores the control relay to its operate position. The microammeter power supply supplies power to the microammeter circuit. The output indicator of the microammeter circuit is a meter relay which is preset to a number of microamperes. When the preset value of current is reached, the control relay opens, voltage is removed from the variable transformer, the clutch is disengaged and a bleeder is connected across the high voltage output terminals. All functions of the tester have an associated panel lamp which indicates the operation being performed.

Power Supply: 103 to 127 volts, AC, 60 cycles per second, 100 watts.
Sensitivity: 5000 microamps to 2 microamps full scale in 11 ranges, ± 2%.
Voltmeter Range: 0 to 10 kilovolts, ±2%.
Output Voltage: Variable 0 to 10 kilovolts at approximately 1000 volts per minute.
Magnetic Voltage Regulation: ±1%.

MANUFACTURERS' OR CONTRACTORS' DATA:

Radio Frequency Laboratories, Incorporated, Boonton, New Jersey; Approximate Cost per Unit, $1920.00.

TUBE COMPLEMENT:

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packe (Lbs.)
			H	W	D	
	Insulation Tester Radio Frequency Labs 1203					

INSULATION TESTER
MODEL 1203
(Radio Frequency Laboratories, Incorporated)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Insulation Tester Radio Frequency Laboratories 1203	metal		18	13	13	49
1	Power Cable						
1	Set, Test Cables						

ELECTRICAL & ELECTRONIC

TEST EQUIPMENT DATA HANDBOOK

VOLUME 7

ACTIVE NETWORKS

7

FREDERICK RESEARCH CORPORATION
2601 UNIVERSITY BOULEVARD, WEST
WHEATON, MARYLAND

ELECTRICAL & ELECTRONIC

TEST EQUIPMENT DATA HANDBOOK

VOLUME 7

ACTIVE NETWORKS

7

FREDERICK RESEARCH CORPORATION
2601 UNIVERSITY BOULEVARD, WEST
WHEATON, MARYLAND

ELECTRONICS TEST EQUIPMENT FUNCTIONAL CLASSIFICATION

7. ACTIVE NETWORKS -- FOR TEST PURPOSES

- 7.1 Amplifying Equipment
  - 7.1.1 DC Amplifier
  - 7.1.2 Audio Amplifier
  - 7.1.3 Video Amplifier
  - 7.1.4 IF Amplifier
  - 7.1.5 RF Amplifier
- 7.2 Active Filter
- 7.3 Active Mixer and Modulator

ELECTRONICS TEST EQUIPMENT FUNCTIONAL CLASSIFICATION - DEFINITIONS

7. ACTIVE NETWORKS -- FOR TEST PURPOSES

A network of interconnected impedances, and amplifiers which require a source of electric power for proper operation.

7. 1 AMPLIFYING EQUIPMENT

An equipment which is controlled by a received electrical voltage or current (input signal) and provides a means of converting a local source of power into an enlarged replica of the input signal.

7. 1. 1 DC AMPLIFIER

An amplifier (as defined in 7. 1) which operates with direct current as a slowly varying input signal.

7. 1. 2 AUDIO AMPLIFIER

An amplifier (as defined in 7. 1) which operates in the frequency range of 15 cycles per second to 20, or more kilocycles per second, and used principally for sound reproduction.

7. 1. 3 VIDEO AMPLIFIER

An amplifier (as difined in 7. 1) which provides wide band operation in the frequency range of 15 cycles per second to 5 megacycles per second.

7. 1. 4 IF AMPLIFIER

An amplifier (as defined in 7. 1) tuned to a fixed frequency, or capable of single control tuning over a range of frequencies, for the purpose of selecting one of the frequency components generated in a mixer circuit.

7. 1. 5 RF AMPLIFIER

An amplifier (as defined in 7. 1) capable of operating at a selected frequency or band of frequencies above 50 kilocycles per second.

7. 2 ACTIVE FILTER

A device employing passive network elements and amplifiers, used for the purpose of transmitting or rejecting signals in particular frequency ranges, or to control the relative output of signals as a function of frequency.

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION - DEFINITIONS

7.3 ACTIVE MIXER AND MODULATOR

A device making use of nonlinear network elements for the purpose of heterodyning or combining two or more electrical signals, and requiring a source of electrical power.

TABLE OF CONTENTS

7. ACTIVE NETWORKS -- FOR TEST PURPOSES

7.1 AMPLIFYING EQUIPMENT

Functional Classification	Designation	Name	
7.1	Ballantine 220B	Decade Amplifier	375
7.1	Kollsman TE 5710	Amplifier, Servo	379
7.1.1	TS-580/U	Direct-Current Amplifier	381
7.1.1	Brush BL-320	Universal Amplifier	383
7.1.1	Brush BL-928	Dual-Channel DC Amplifier	387
7.1.1	Brush BL-932	Amplifier, DC	389
7.1.3	AN/UPA-1	Detector-Amplifier Assembly	391
7.1.3	Tektronix 121	Preamplifier	395
7.1.5	Hewlett-Packard 490B	Traveling Wave Tube Amplifier	397
7.1.5	Hewlett-Packard 491A	Traveling Wave Tube Amplifier	401
7.1.5	Spencer-Kennedy 202D	Amplifier, Wideband	403

7.3 ACTIVE MIXERS AND MODULATORS

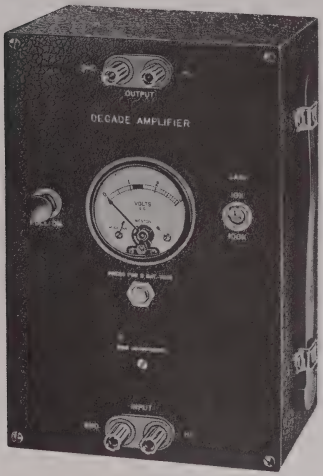
Functional Classification	Designation	Name	
7.3	Boonton 203-B	Univerter	409
7.3	General Radio DNT-3	Detector	413
7.3	Hewlett-Packard 540B	Transfer Oscillator	417

ALPHA-NUMERICAL INDEX

Designation	Name	Functional Classification
AN/UPA-1	Detector-Amplifier Assembly	7. 1. 3
TS-580/U	Direct-Current Amplifier	7. 1. 1
Ballantine 220B	Decade Amplifier	7. 1
Boonton 203-B	Univerter	7. 3
Brush BL-320	Universal Amplifier	7. 1. 1
Brush BL-928	Dual-Channel DC Amplifier	7. 1. 1
Brush BL-932	Amplifier, DC	7. 1. 1
General Radio DNT-3	Detector	7. 3
Hewlett-Packard 490B	Traveling Wave Tube Amplifier	7. 1. 5
Hewlett-Packard 491A	Traveling Wave Tube Amplifier	7. 1. 5
Hewlett-Packard 540B	Transfer Oscillator	7. 3
Kollsman TE 5710	Amplifier, Servo	7. 1
Spencer-Kennedy 202D	Amplifier, Wideband	7. 1. 5
Tektronix 121	Preamplifier	7. 1. 3

7. 1 AMPLYFYING EQUIPMENT

DECADE AMPLIFIER
MODEL 220B
(Ballantine Laboratories, Incorporated)



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment originally designed to increase the sensitivity of Electronic Voltmeter Ballantine 300. An application of the combined equipments is in low-level noise measurement. The unit can also be used for other applications where stable voltage gains of 10 or 100 are required.

RELATIONSHIP TO OTHER EQUIPMENT:

The unit is used in conjunction with the Electronic Voltmeter Ballantine 300.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The amplifier comprises two stages and utilizes overall degenerative feedback to stabilize the gain so that normal variations of battery voltage and changes in tubes and other circuit parameters do not affect the gain by more than 2%. Feedback is also adopted to provide relatively low source impedances at the amplifier output terminals for the two gain settings, thus allowing the unit to operate effectively into loads lower than those imposed by

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			

PROCUREM'T INFO.:

PROCUREM'T COG.: DESIGN COG.: Commercial

F.I.I.N.: FUNCTIONAL CLASS. NO.: 7.1

DECADE AMPLIFIER
MODEL 220B
(Ballantine Laboratories, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

the input impedance of the associated voltmeter. If the output of the amplifie is fed into loads with a shunt capacity greater than 30 micromicrofarads or resistance lower than 0.5 megohm, the gain may vary beyond the specifie limits of 2%. The physical design of the amplifier includes a double system o antimicrophonic mounting for the input tube which reduces the effect of mechanical shock and vibration when the amplifier is employed in low-leve service.

Power Supply: Two Eveready 742, two Eveready 467 or equivalent.
Meter Range: 0 to 3 volts, DC.
Frequency Range: 10 to 150,000 cycles per second.
Input Impedance: 5 megohms shunted by 15 micromicrofarads.
Output Impedance: Less than 900 ohms in series with 2 microfarads for a gain o 10 times; less than 7000 ohms in series with 2 microfarads for a gain of 10 times.
Voltage Gain: 10 or 100 times.
Inherent Noise: Approximately 8 microvolts, referred to series grid circuit o first tube stage; total noise with input terminals open circuited is approximatel 25 microvolts.

MANUFACTURERS' OR CONTRACTORS' DATA:

Ballantine Laboratories, Inc., 102 Fanny Road, Boonton, New Jersey; Approximate Cost per Unit, $105.00.

TUBE COMPLEMENT:

2 1U4.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

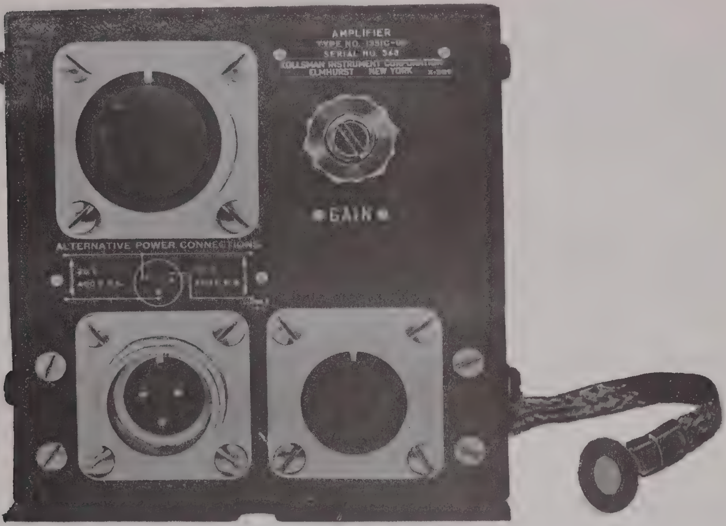
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.)
			H	W	D	
1	Decade Amplifier, Ballantine 220B					12

DECADE AMPLIFIER
MODEL 220B
(Ballantine Laboratories, Incorporated)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Decade Amplifier Ballantine 220B	metal		4-1/2	5-3/4	8-3/4	7-3/4
2	Battery Eveready 467						
2	Battery Eveready 742						

AMPLIFIER, SERVO
Part No. TE 5710
(Kollsman Instrument Corporation)


AMPLIFIER
KOLLSMAN INSTRUMENT CORPORATION
ELMHURST NEW YORK
GAIN
ALTERNATIVE POWER CONNECTIONS

FUNCTIONAL DESCRIPTION:

This instrument is for use in testing the C-2A True Airspeed and Mach Number Computer. It is designed to amplify the outputs of the absolute pressure and differential pressure transmitters, and the outputs of the logarithmic absolute pressure and true airspeed transmitting synchros.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The amplifier consists of a conventional, three tube circuit. A 10,000-ohm potentiometer is used to control the amplifier gain. The potentiometer knob on the panel has a centered locking screw with a slotted head. All electrical connections, except the ground strap, are made through three AN type connectors on the front panel.

Power Supply:

26 volts, 400 cycles, AC, single-phase.
or
115 volts, 400 cycles, AC, single-phase.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 7.1		
- Electronics Test Equipment - Kollsman TE 5710			

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

AMPLIFIER, SERVO
Part No. TE 5710
(Kollsman Instrument Corporation)

MANUFACTURERS' OR CONTRACTORS' DATA:

Kollsman Instrument Corporation, 80-08-45th Avenue, Elmhurst 73, New York Contract No. AF 33(600)27206; Contract Date, 20 May 1954; Approximate Cost per Unit, $190.00.

TUBE COMPLEMENT:

1 JAN-12AX7, 1 JAN-6AQ5, 1 JAN-6X4.

REFERENCE DATA AND LITERATURE:

TO 5F5-3-5-3 (Overhaul Instructions).

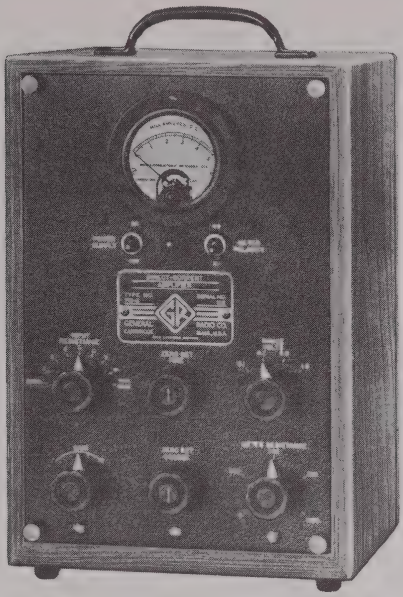
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	
1	Amplifier, Servo (Kollsman TE 5710)	0.19	6	6	9	6

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weigh (Lbs.
				H	W	D	
1	Amplifier, Servo (Kollsman TE 5710)			3-3/4	3-1/2	7-1/4	2-5/8

DIRECT-CURRENT AMPLIFIER TS-580/U



UNCTIONAL DESCRIPTION:

A portable, general purpose equipment, designed primarily for use with a milli-mmeter recorder. The combination of amplifier and recorder is capable of accu-ately recording small DC voltages and currents. In addition to its use as a record-ng DC milliammeter or millivoltmeter, it has a number of applications in process ontrol and in measurements in physical and chemical laboratories. The amplifier s highly stable and gives full-scale output over its input voltage range. Means are rovided for selecting a considerable range of input resistances. Output resistance s compensated for resistances of external devices. Self-contained indication is rovided on a DC milliammeter dial. For applications where relative values only re of interest, the gain can be varied for necessary accommodation.

ELATIONSHIP TO OTHER EQUIPMENT:

This equipment is similar to General Radio DC Amplifier Type 715-AM. It is sed with the Esterline-Angus 5-milliampere Recorder (TS-584/U).

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			2C411
PROCUREM'T INFO.: Army Spec. 71-3347(SigC)			
PROCUREM'T COG.: Army		DESIGN COG.: Army, CSL	
F.I.I.N.:		RDB IDENT. NO.: 7.1.1	
- Electronics Test Equipment -			TS-580/U

s project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S.

DIRECT-CURRENT AMPLIFIER TS-580/U

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 105 to 125/210 to 250 volts, AC, 60 cycles per second, single phase, 35 watts.

Input Voltage: 0.1, 0.2, 0.5, and 1.0 volt.

Output Current: 5 milliamperes, linear, at 1000 ohms.

Output Power: 25 milliwatts.

Gain: 50,000 micromhos, maximum, transconductance.

Input Resistance: 100 ohms to 10 megohms, ranging in powers of 10. Short-circui and open-circuit positions are also supplied.

Input Resistance when Variable Gain Control is Used: 150,000 ohms (Voltage available must exceed 1.0 volt when using the variable gain control).

Input Circuit Grid Current: Less than 0.002 microampere.

Compensating Resistance: Compensates for meter resistances of 250, 500, 750, and 1000 ohms, so the instrument always works into 1000 ohms.

Accuracy: ±1% of full scale, as a calibrated voltmeter.

Temperature Range: 65° F. to 95° F.

Humidity Range: 0 to 95% relative.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Radio Company, Cambridge 39, Massachusetts; Approximate Cost pe Unit, $320.00.

TUBE COMPLEMENT:

2 JAN-6J7G, 1 JAN-6X5G, 1 JAN-4A1, 1 JAN-6F6G, 1 JAN-OC3/VR-105.

REFERENCE DATA AND LITERATURE:

TM 11-2587 (Instruction Book).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.
				H	W	D	
1	Direct-Current Amplifier TS-580/U Including:	Wood	2C411	15-1/4	8-1/2	9	22.25
1	Line Connector Cord			84 long			
2	Plug GR Type 274-M						

UNIVERSAL AMPLIFIFR
MODEL NO. BL-320
(Brush Electronics Company)

FUNCTIONAL DESCRIPTION:

A portable, special purpose equipment which operates with a low input and is used to provide a voltage signal to operate a direct-writing oscillograph. The instrument may be used to amplify and convert the input from strain gage transducers, pressure and acceleration pickups, and temperature pickups if the oscillograph is calibrated for the particular transducer.

RELATIONSHIP TO OTHER EQUIPMENT:

The BL-320 is used with Direct-Writing Magnetic Oscillograph Brush BL-202 or BL-222 and is compensated for the oscillograph in order to achieve a flat frequency response within the specified range.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The BL-320 is basically a self-contained AC Wheatstone bridge including a voltage amplifier, a discriminator, and a DC power amplifier. The instrument is particularly adapted for use with strain gages having

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.:		DESIGN COG.:	Commercial
.I.L.N.:		FUNCTIONAL CLASS. NO.:	7.1.1
	- Electronics Test Equipment -		Brush BL-320

UNIVERSAL AMPLIFIER
MODEL NO. BL-320
(Brush Electronics Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

120-ohm resistance (such as the Baldwin-Lima-Hamilton SR-4), but may b recalibrated for other transducers. The instrument is protected by a 2-am fuse.

Power Supply (External): 115 volts, AC, 60 cycles per second, single-phase, 13 watts.

Range of Measurable Strain: 10 to 40,000 micro-inches per inch with SR-4 gag or equivalent.

Frequency Response: 0 to 120 cycles per second (when used with BL-202 or BL 222).

Output Impedance: 50 ohms, approximately.

Load Impedance: Must be 1500 ohms or higher.

DC Amplifier (when used with BL-202):
- Frequency Range: 0 to 120 cycles per second.
- Input Impedance: 5 megohms.
- Normal Sensitivity: 175 millivolts per chart line.
- Carrier Oscillator Frequency: 2000 cycles per second.
- Attenuation Factors: 200, 100, 50, 20, 10, 5, 2, 1.

MANUFACTURERS' OR CONTRACTORS' DATA:

Brush Electronics Company, 3405 Perkins Avenue, Cleveland 14, Ohio.

TUBE COMPLEMENT:

2 6SJ7, 1 6C5, 1 6H6, 1 6SN7, 2 6V6, 2 VR-150, 1 VR-105, 1 VR-75, 1 5U4GT

REFERENCE DATA AND LITERATURE:

ED 31203 Operating Instructions.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.)
			H	W	D	
	Universal Amplifier Brush BL-320					

UNIVERSAL AMPLIFIER
MODEL NO. BL-320
(Brush Electronics Company)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Universal Amplifier Brush BL-320	metal		17-1/2	11	7-1/2	30

DUAL-CHANNEL DC AMPLIFIER
MODEL NO. BL-928
(Brush Electronics Company)

FUNCTIONAL DESCRIPTION:

A portable, special purpose equipment developed primarily for coupling external circuits to double-channel magnetic Oscillographs BL-201 or BL-202. The instrument is used in the study of battery, DC generator, motor, and photocell output characteristics; and for electrolysis surveys. Test results are indicated graphically.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 95 to 125 volts, AC, 60 cycles per second, 145 watts.
Frequency Response: 0 to 100 cycles per second.
Sensitivity: 1 millimeter per 50 millivolts.
Stability: 0.25 millimeter pen drift or less per hour.
Voltage Gain: 25 times.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.:	Commercial
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	7.1.1
	- Electronics Test Equipment -		Brush BL-928

DUAL-CHANNEL DC AMPLIFIER
MODEL NO. BL-928
(Brush Electronics Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Input Impedance: 10 megohms.

Output Impedance: 50 ohms, approximately; must not be loaded with less than 1500 ohms.

Input Voltage Range: 0.05 to 200 volts.

Output Voltage: 15 volts rms maximum.

MANUFACTURERS' OR CONTRACTORS' DATA:

Brush Electronics Company, 3405 Perkins Avenue, Cleveland 14, Ohio; Approxi mate Cost per Unit, $565.00.

TUBE COMPLEMENT:

4 6F5, 2 6V6, 4 VR-150.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

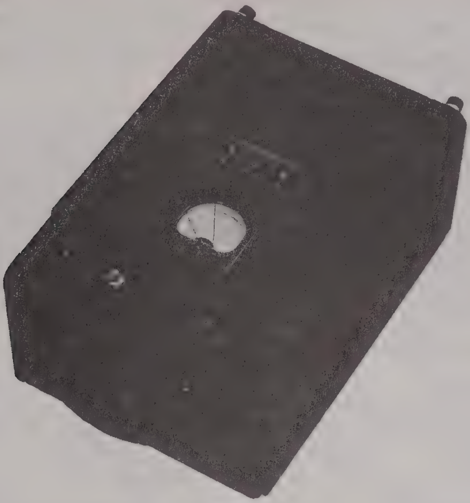
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Dual-Channel DC Amplifier Brush BL-928	metal		17-1/2	11	7-1/2	30

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.)
			H	W	D	
	Dual-Channel DC Amplifier Brush BL-928					

AMPLIFIER, DC
Model No. BL-932
(Brush Electronics Company)



FUNCTIONAL DESCRIPTION:

A portable DC amplifier developed primarily for use with Magnetic Oscillographs Models BL-201, BL-202, and BL-206.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The amplifier consists of five stages of amplification, a calibrating circuit, and an electronically regulated power supply. The amplifier circuit incorporates direct coupling between all stages. The first and second stages of the amplifier utilize a self-balancing circuit in which one tube is balanced against another to minimize the effects of drift and power supply regulation. A calibrating circuit is included in the amplifier so that the pen deflection of the oscillograph can be accurately correlated to the input voltage of the amplifier. The control panel contains a calibrating meter, balance control, gain control, attenuator, calibrating button, and calibrating voltage control.

Power Supply: 100 to 125 volts, AC, 60 cycles per second, single phase.

Input Voltage: 0.001 to 200 volts.

Output Voltage: 15 volts (maximum rms).

Input Impedance: 9 megohms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 7.1.1		
	- Electronics Test Equipment -		Brush BL-932

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

AMPLIFIER, DC
Model No. BL-932
(Brush Electronics Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)
Output Impedance: Approximately 50 ohms (not to be loaded with less than 1500 ohms).
Frequency Response of Amplifier and Oscillograph: DC to 100 cycles per second.
Sensitivity: 1 chart millimeter per millivolt.
Stability: Drift of less than 1 chart millimeter per hour.

MANUFACTUERES' OR CONTRACTORS' DATA:
Brush Electronics Company, 3405 Perkins Avenue, Cleveland 14, Ohio.

TUBE COMPLEMENT:
2 matched JAN-6F5 (for use in first stage only), 2 matched JAN-6F5 (for use in second stage only), 2 JAN-6F5, 1 JAN-5U4G, 1 JAN-6AS7, 1 JAN-5651, 1 JAN-6SL7, 1 JAN-6U6, 1 JAN-OD3/VR150, 2 JAN-OC3/VR105.

REFERENCE DATA AND LITERATURE:
Operating Information, Brush Electronics Company.

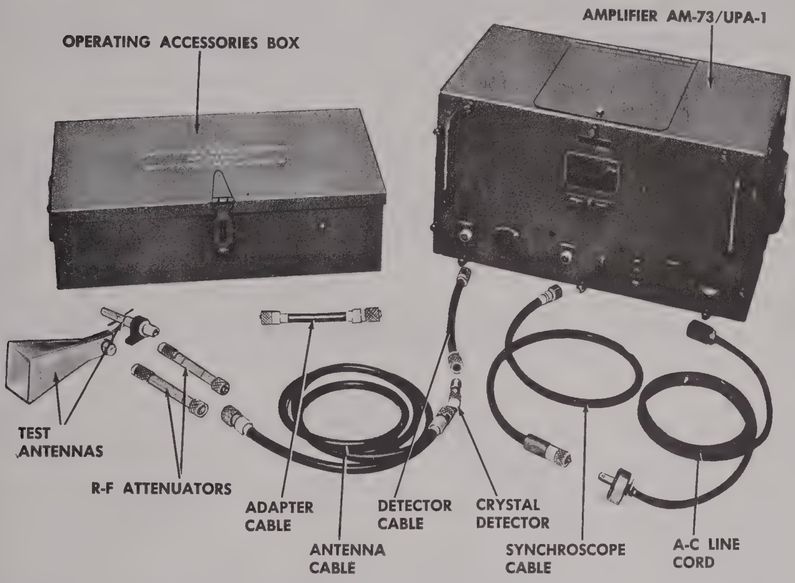
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Amplifier, DC (Brush BL-932)	1.79	10-1/2	14	21	38

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Amplifier, DC (Brush BL-932)			7-1/2	11	17-1/4	34

DETECTOR-AMPLIFIER ASSEMBLY AN/UPA-1
(AMPLIFIER, DETECTOR GROUP, AN/UPA-1)



UNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained test unit for use in examining the nvelope" of transmitted radar or other radio frequency signals. This equipment ctifies and amplifies without detecting frequencies between 100 cycles per second d 6 megacycles per second and detects frequencies above 6 megacycles per sec-d, amplifying the resultant "envelope" representing modulating frequencies from 0 cycles per second to 6 megacycles per second. Visual indication of the am-ifier output appears on an external oscilloscope.

ELATIONSHIP TO OTHER EQUIPMENT:

The Detector Amplifier Assembly is intended expecially for use with Synchro-ope TS-28/UPN but may be used with an ordinary radar oscilloscope.

LECTROMECHANICAL DESCRIPTION:

wer Supply: 105 to 125 volts, AC, single phase, 50 to 70 cycles per second, 53.5 watts at 117.5 volts.

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.	Limited Standard		
TOCK NOS.	7CAC-033210	N16-(LT)T75535-998	2S5504-1
ROCUREM'T INFO.: Navy Spec. MIL-D-15481, 8-1-50, Navy Spec. RE 13A987.			
ROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 7.1.3	
	- Electronics Test Equipment -		AN/UPA-1

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

DETECTOR-AMPLIFIER ASSEMBLY AN/UPA-1
(AMPLIFIER, DETECTOR GROUP, AN/UPA-1)

ELECTROMECHANICAL DESCRIPTION: (Continued)
Frequency Range: 100 cycles per second to 6 megacycles per second.
Gain in Decibels: Approximately 40 decibels.
Input Impedance: 50 ohms.
Output Impedance: 50 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

Belmont Radio Corporation, Chicago 39, Illinois; Navy Contract No. NXsr-6926 17 August 1944; Navy Contract No. N5sr-4674, 25 May 1945; Approximate Cost pe Unit, $2380.00.

TUBE COMPLEMENT:

3 JAN-6AC7, 1 JAN-6AG7, 1 JAN-OC3/VR-105, 1 JAN-5Y3GT, 1 JAN-1N23 (Crys tal Rectifier).

REFERENCE DATA AND LITERATURE:

TO 16-30UPA1-5 (Instruction Book).
Ships 271(A) (Instruction Book).
Sig 8-AN/UPA-1 (Spare Parts).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	
1	Detector-Amplifier Assembly AN/UPA-1 (Domestic Packed)	6.9	26-1/2	19-1/2	23	109
1	Equipment Spares Parts Box	3.2	23	17	14-3/16	75

EQUIPMENT SUPPLIED:

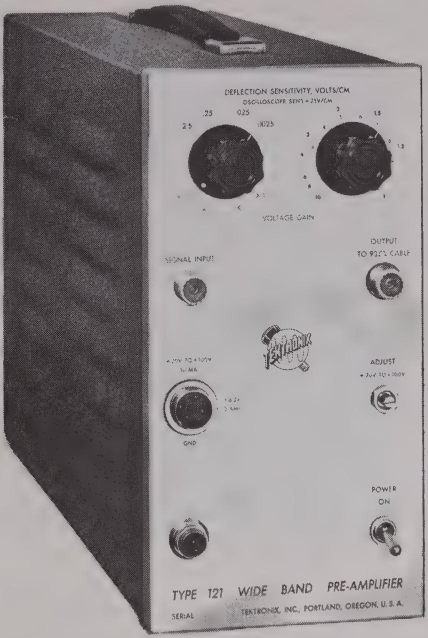
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weigh (Lbs.
				H	W	D	
1	Detector-Amplifier Assembly AN/UPA-1 (Complete)		7CAC-033210 N16-(LT)T75535-998 2S5504-1				
1	Servo Amplifier AM-73/UPA-1		7CAC-036121 2C449-73	18-1/2	10-3/4	12	55.00

DETECTOR-AMPLIFIER ASSEMBLY AN/UPA-1
(AMPLIFIER, DETECTOR GROUP, AN/UPA-1)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Crystal Detector Unit CHS 1N23		2Z5042-26	5/8	1	1-3/4	0.125
1	Antenna Assembly AS-23/AP		7CAC-045140 2A264-23	2-5/8	2	2-1/2	0.200
1	Pick-up Antenna AT-48/UP		7CAC-045600 2A203-48	2-1/4	3-3/4	1-1/4	0.560
1	RF Attenuator TPS-51-PB/10		1600-286066062 2Z394.14	5	5/8 dia.		0.250
1	RF Attenuator TPS-51-PB/20		7CAC-075604-7 2Z394.47	5	5/8 dia.		0.250
1	Antenna Cable		1F425-9.72-1	72 long			0.750
1	Detector Cable			10 long			0.220
1	Synchroscope Cable		7CAC-170265-661 1F425-63.36	36 long			0.530
1	Adapter Cable		7CAC-170265-412 1F425-9.6	6 long			0.220
1	AC Line Cord		7CAC-170264-335 3E7256-2	72 long			0.500
1	Equipment Spare Parts Box						

PREAMPLIFIER
MODEL NO. 121
(Tektronix Incorporated)


DEFLECTION SENSITIVITY, VOLTS/CM
VOLTAGE GAIN
SIGNAL INPUT
OUTPUT TO 93Ω CABLE
ADJUST
GND
POWER ON
TYPE 121 WIDE BAND PRE-AMPLIFIER
SERIAL
TEKTRONIX, INC., PORTLAND, OREGON, U. S. A.

UNCTIONAL DESCRIPTION:

A portable, special purpose self-contained, three stage amplifier, designed pri-narily, to increase the sensitivity of oscilloscopes. A combination of step and con-inuous attenuators on the amplifier provides a wide range of sensitivity without the se of attenuators on the oscilloscope.

ELATIONSHIP TO OTHER EQUIPMENT:

It is used with Oscilloscope AN/USM-24 or Oscilloscope TS-239/UP to test Radio ransmitting Set AN/AXT-10.

LECTROMECHANICAL DESCRIPTION:

ront Panel Power Supply Socket: 6.3 volts, DC, 20 to 120 volts, DC. This supplies DC plates and heaters so when both high input impedance and high gain are necessary, a cathode follower probe or a special preamplifier stage mounted directly on the signal source may conveniently be used.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.:	Commercial
F.I.I.N.:		FUNCTIONAL CLASS NO.: 7.1.3	

PREAMPLIFIER
MODEL NO. 121
(Tektronix Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Range: 5 cycles per second to 10 megacycles per second.
Voltage Gain: 100 maximum.
Input Impedances: 1 megohm shunted by 20 micromicrofarads direct.
Maximum Output: ±1 volt peak into a 93 ohm cable.
Sensitivity Range: 2.5 microvolts per centimeter to 25 volts per centimeter.
Bandwidth: More than 12 megacycles per second.
Band Pass: 5 cycles per second to 12 megacycles per second.
Power Supply: 105-125/210-250 volts, AC, 50-60 cycles per second, single phase, 80 watts.

MANUFACTURERS' OR CONTRACTORS' DATA:

Tektronix, Inc., P.O. Box 831, Sunset Highway and Barnes Road, Portland 7, Oregon; Approximate Cost per Unit, $265.00, January 1953.

TUBE COMPLEMENT:

2 RETMA-6CB6, 3 RETMA-6J6, 1 RETMA-12AX7, 2 RETMA-6X4, 1 RETMA-25L6, 1 RETMA-6AU6, 1 RETMA-5651, 1 RETMA-6AH6.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog "Tektronix", March 1952.

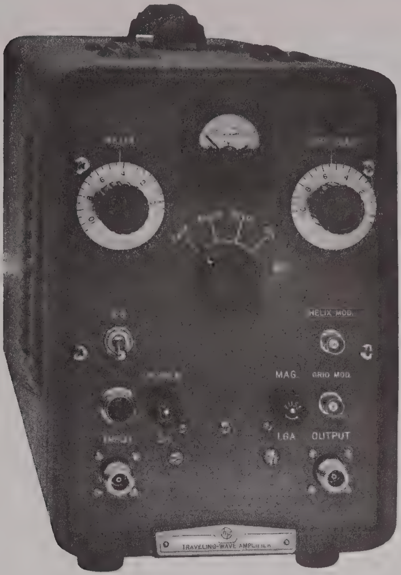
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Preamplifier Model No. 121			11-1/4	5-3/4	15	18.5

TRAVELING WAVE TUBE AMPLIFIER
MODEL 490B
(Hewlett-Packard Company)



UNCTIONAL DESCRIPTION:

A portable, general purpose instrument used to provide broadband, high gain nd low noise amplification in the 2.4 to 4.0 kilomegacycle per second band. The mplifier may be used for calibrating CW doppler radar, eliminating klystron de-ay and jitter, pre-amplification of receivers and detectors, measuring antenna atterns, measuring wide range attenuators, high power measurements, low level, ow noise amplification, and high speed pulse generation.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The amplifier basically consists of a traveling wave tube with matching helical couplers at both input and output ends of the tube and a power supply. Front panel controls are provided for adjusting the helix and grid or anode potentials. A panel meter permits continuous monitoring of the tube

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.:	Commercial
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	7.1.5

TRAVELING WAVE TUBE AMPLIFIER
MODEL 490B
(Hewlett-Packard Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

operation. Type N connectors are provided for coupling input and output signals.

Power Supply: 115 volts ±10%, AC, 50 to 1000 cycles per second, 125 watts.

Frequency Range: 2.0 to 4.0 kilomegacycles per second.

Gain: 30 decibels, minimum.

Output Power: 10 milliwatts, minimum.

Output Impedance: 50 ohms.

Noise Figure: Less than 25 decibels.

Pulse Rise and Decay Time: 0.015 microsecond.

Modulated Pulse Delay: 0.035 microsecond.

Amplitude Modulating Voltage: 50 volts peak positive pulse will produce a 40 decibel change in RF power output. One decibel above 1 microvolt sensitivity, approximately.

Helix Modulating Voltage: 30 volts peak-to-peak provides 360° phase shift.

Helix Modulating Input Impedance: 1.0 megohm.

Hum, Spurious Modulation: 30 decibels below signal level.

Input Impedance: 50 ohms.

Standing-Wave Ratio: Less than 2 (input and output).

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, $1,100.00.

TUBE COMPLEMENT:

1 Huggins Laboratories HA-1HP

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

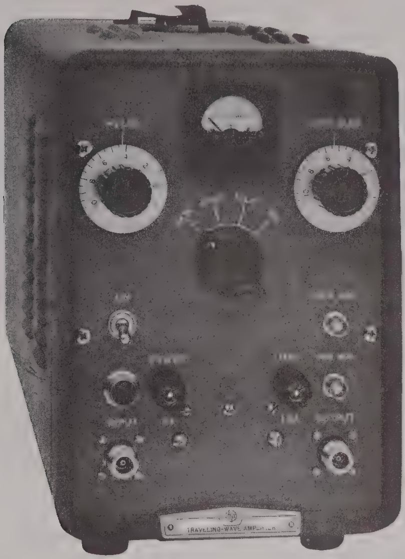
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packe (Lbs.)
			H	W	D	
	Traveling Wave Tube Amplifier, Hewlett-Packard 490B					

TRAVELING WAVE TUBE AMPLIFIER
MODEL 490B
(Hewlett-Packard Company)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Traveling Wave Tube Amplifier Hewlett-Packard 490B	metal		11-1/2	7-1/2	19-1/2	55

TRAVELING WAVE TUBE AMPLIFIER
MODEL 491A
(Hewlett-Packard Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument used to provide broadband, high gain and low noise amplification in the 2.0 to 4.0 kilomegacycle per second band. The amplifier is particularly suited for calibrating CW doppler radar, eliminating klystron delay and jitter, pre-amplification of receivers and detectors, measuring antenna patterns, measuring wide range attenuators, high power measurement, and low level, low noise amplification.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The amplifier basically consists of a traveling wave tube with matching helical couplers at both input and output ends of the tube, and a power supply. Front panel controls are provided for adjusting the helix and grid or anode voltages. A panel meter permits continuous monitoring of the

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:	Navy	DESIGN COG.:	Commercial
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	7.1.5

TRAVELING WAVE TUBE AMPLIFIER
MODEL 491A
(Hewlett-Packard Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

tube operation. Type N connectors are provided for coupling input and output signals.

Power Supply: 115 volts ±10%, AC, 50 to 60 cycles per second, 250 watts.
Frequency Range: 2.0 to 4.0 kilomegacycles per second.
Gain: 30 decibels, minimum.
Output Power: 1.0 watt minimum into 50 ohm load.
Noise Figure: Less than 30 decibels.
Modulation: Not provided.
Hum, Spurious Modulation: 30 decibels below signal level.
Input Impedance: 50 ohms.
Standing-Wave Ratio: Less than 2.
Traveling-Wave Tube: Huggins Laboratories HA-2HPA.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, $1,100.00.

TUBE COMPLEMENT:

1 Huggins Laboratories HA-2HPA.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weigh (Lbs.
				H	W	D	
1	Traveling Wave Tube Amplifier Hewlett-Packard 491A	metal		11-1/2	7-1/2	20	65

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	
	Traveling Wave Tube Amplifier, Hewlett-Packard 491A					

AMPLIFIER, WIDEBAND
Model 202D
(Spencer-Kennedy Laboratories, Incorporated)

FUNCTIONAL DESCRIPTION:

A general purpose, radio frequency amplifier, characterized by a wide bandwidth, fast rise time, and stable gain. The amplifier is designed for either continuous wave signals or extremely short pulses. Because of the flat transmission feature, a number of amplifiers can be cascaded with little change in rise time, thus providing useful amplification for low level broadband voltages such as pulses, transients, and high frequency signals. The amplifier is designed for standard rack mounting.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The basic circuit utilizes two identical stages or chains of six 6AK5 tubes. Each stage is coupled into 200-ohm plate and grid delay lines which are composed of tapped inductances and the capacitances of the tubes and tube sockets. Waves entering the input of a stage travel down the grid delay line exciting successive tube grids in the stage. As each grid is energized, plate current will flow half forward and half backward down the plate line. Because the delay in the plate and grid lines are the same, the resultant plate currents from successive tubes add in the forward direction and the output voltage, therefore, is their sum. The backward component waves are absorbed by the line terminating resistor. The second stage is inverted so that the output of the first stage feeds directly into the input of the second stage. Variable trimmers permit adjustment of the response characteristic to fit particular applications. A regula-

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 7.1.5	
	- Electronics Test Equipment - Spencer-Kennedy 202D		

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

AMPLIFIER, WIDEBAND
Model 202D
(Spencer-Kennedy Laboratories, Incorporated)

ELECTROMECHANICAL DESCRIPTION:

ted power supply insures constant gain over wide changes of live voltage.

Power Supply: 105 to 125 volts, AC, single phase, 50 to 60 cycles per second, 57 watts.

Bandwidth: 1 kilocycle per second to 210 megacycles per second.

Frequency Response: Flat to within ±1.5 decibels from 2 kilocycles per second to 200 megacycles per second.

Voltage Gain: 20 decibels.

Rise Time: Less than 0.0026 microsecond (10% to 90% amplitude).

Impedance: 200 ohms.

Noise Figure: 9 decibels (70 microvolts equivalent input noise) (except that power supply ripple not exceeding 7.0 millivolts at 60 cycles per second appears across the 200-ohm output load).

Maximum Undistorted Output Voltage: 4 volts rms.

Open Circuit Maximum Output Voltage: 11 volts peak.

Gain Regulation: ±0.2 decibel for line voltage changes from 110 to 125 volts.

MANUFACTURERS' OR CONTRACTORS' DATA:

Spencer-Kennedy Laboratories, Incorporated, 186 Massachusetts Avenue, Cambridge 39, Massachusetts; Contract No. AF 33(600)22852.

TUBE COMPLEMENT:

1 JAN-OA2, 12 JAN-6AK5.

REFERENCE DATA AND LITERATURE:

Manufacturer's Bulletin 202D.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Amplifier, Wideband Spencer-Kennedy Model 202D					20

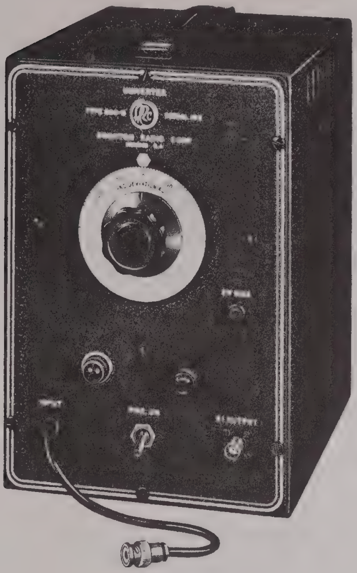
AMPLIFIER, WIDEBAND
Model 202D
(Spencer-Kennedy Laboratories, Incorporated)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Amplifier, Wideband Spencer-Kennedy Model 202D			3-1/2	19	11	17

7. 3 ACTIVE MIXERS AND MODULATORS

UNIVERTER
TYPE 203-B
(Boonton Radio Corporation)



UNCTIONAL DESCRIPTION:

A portable, special purpose equipment used to extend the lower frequency
nge of a signal generator. The unit also enables the swept frequency and modu-
ion incorporated in the signal generator, as well as the attenuator calibration,
be used at these lower frequencies with a minimum of distortion. The output
equency of the unit is determined by subtracting 70 megacycles per second from
e frequency dial reading of the associated sweep signal generator.

ELATIONSHIP TO OTHER EQUIPMENT:

The univerter is used on conjunction with Signal Generator SG-91/U

LECTROMECHANICAL DESCRIPTION:

rcuit Information: The unit consists basically of a local oscillator, a mixer
stage, two wideband amplifier stages, a cathode follower output stage, and a
regulated power supply. In operation the signal from the local oscillator is

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.		Standard	
OCK NOS.			
ROCUREM'T INFO.:			
ROCUREM'T COG.:	Navy	DESIGN COG.:	Commercial
. I. N.:		FUNCTIONAL CLASS.	NO.: 7.3
	- Electronics Test Equipment -		Boonton 203-B

UNIVERTER
TYPE 203-B
(Boonton Radio Corporation)

ELECTROMECHANICAL DESCRIPTION: (Continued)

heterodyned with the signal from the associated signal generator and the resultant frequency is passed through the wideband amplifier to the output system. Means are provided which permit the frequency of the local oscillator to be varied over a narrow frequency range.

Power Supply: 105 to 125 volts, AC, 50 to 60 cycles per second, 50 watts.

Frequency Range: 0.4 to 25 megacycles per second, 0.1 to 25 megacycles per second with no carrier deviation.

Frequency of Local Oscillator: 70 megacycles per second.

Local Oscillator Frequency Deviation: ±250 kilocycles per second in increments of 10 kilocycles per second.

Radio Frequency Output: 1 microvolt to 0.1 volt ±2 decibels; 2 volts.

Output Impedance: 50 ohms, 470 ohms.

Distortion:

Frequency Modulation: Not appreciable.

Amplitude Modulation: Not more than 6.5% overall at 50% modulation with 0.1 volt output.

MANUFACTURERS' OR CONTRACTORS' DATA:

Boonton Radio Corporation, Boonton, New Jersey; Approximate Cost per Unit, $420.00.

TUBE COMPLEMENT:

1 6X5, 3 6J6, 1 6AG7, 1 4-25 (Ballast).

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

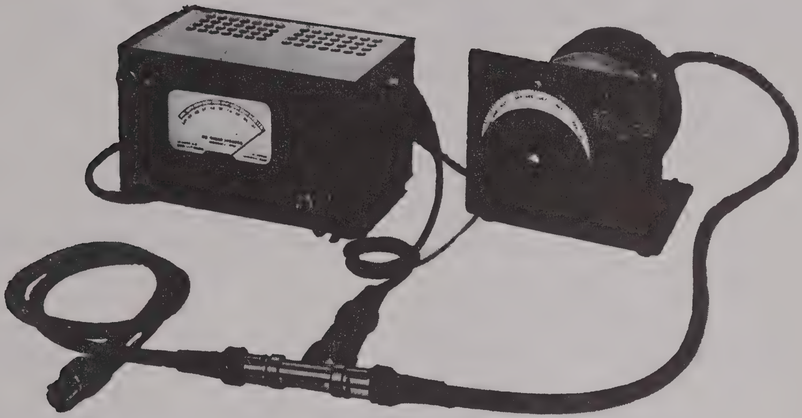
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weigh Packe (Lbs.
			H	W	D	
1	Univerter, Boonton 203-B					16

UNIVERTER
TYPE 203-B
(Boonton Radio Corporation)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Univerter, Boonton 203-B	metal		11-1/2	7-3/8	10-1/2	12
1	High Output Jack						

DETECTOR
TYPE DNT-3
(General Radio Company)



UNCTIONAL DESCRIPTION:

A portable, general purpose wide-band converter used to detect radio frequency nd pulsed radio frequency signals. The equipment may be used to measure relaive voltage levels, insertion loss and attenuation of filters, attenuators and cables nd to calibrate high-frequency attenuators. In addition the instrument may be sed as a detector for null type measuring devices and as a detector for voltage atio type measurements. Results are indicated on a meter located on the front anel of the unit intermediate frequency amplifier.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The equipment is comprised of a mixer rectifier, a unit intermediate frequency amplifier and a unit oscillator. The signal to be measured and the signal from the unit oscillator are heterodyned in the mixer rectifier

(Continued)

	AIR FORCE	NAVY	ARMY
YPE CLASS.			
TOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Commercial	
.I.I.N.:		FUNCTIONAL CLASS. NO.: 7.3	

DETECTOR
TYPE DNT-3
(General Radio Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)
to obtain a 30 megacycle per second difference frequency. This beat frequency is amplified and indicated on the meter.

Power Supply: 105 to 125 or 210 to 250 volts, AC, 50 to 60 cycles per second; 320 volts DC at 40 milliamps, 6.3 volts, AC, at 0.4 amps.

Fundamental Frequency Range: 220 to 950 megacycles per second.

Mixer Rectifier:
- Frequency Range: 40 to 5000 megacycles per second.
- Crystal Current: 25 milliamps, maximum.
- Input: 2 volts, maximum.
- Cut-Off Frequency of Output Filter: 40 megacycles per second.
- Conversion Loss: 6 decibels at 30 megacycles per second output when local oscillator fundamental is used.

Unit Intermediate Frequency Amplifier:
- Center Frequency: 30 megacycles per second.
- Bandwidth: Greater than 0.5 megacycles per second at 3 decibels down; 9.5 megacycles per second at 60 decibels down.
- Sensitivity: 2 microvolt input from a 400 ohm source for 1% meter deflection (above noise), 50 microvolts input for full scale meter deflection.
- Attenuator Range: 0 to 70 decibels in 10 decibel steps.
- Attenuator Accuracy: +1% ±0.3 decibel.
- Output Circuit Bandwidth (Modulation): 0.4 megacycles per second.
- Output Impedance: 600 ohms.

Unit Oscillator:
- Frequency Range: 250 to 920 megacycles per second, ±1%.
- Warm-up Frequency Drift: 0.2%.
- Power Output: 120 or 200 milliwatts dependent upon power supply used.
- Amplitude Modulation (Sine Wave): 30% at 40 volts into 8000 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:
General Radio Company, Baker Avenue, West Concord, Massachusetts; Approximate Cost per Unit, $659.00.

TUBE COMPLEMENT:
2 6CB6, 1 6AK5, 1 6AL5 1 6U8, 1 OB2

REFERENCE DATA AND LITERATURE:
Manufacturer's Catalog.

DETECTOR
TYPE DNT-3
(General Radio Company)

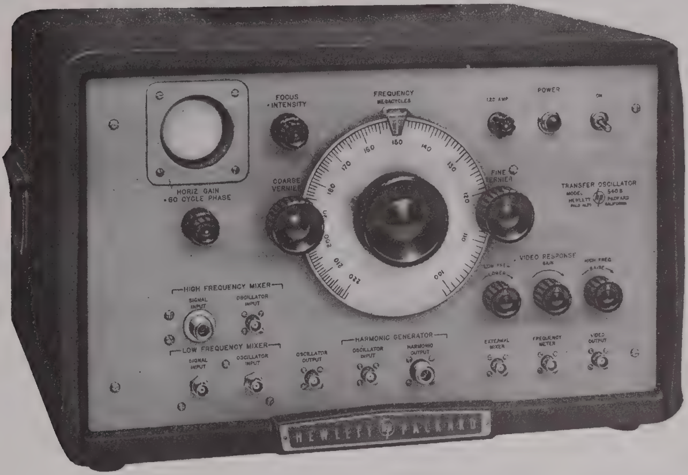
QUIPMENT SUPPLIED:

uant. Per q'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Detector, General Radio DNT-3 including:	metal					
1	Unit Oscillator, General Radio 1209-B	metal		7	6-1/4	9-1/4	6-1/4
1	Unit IF Amplifier, General Radio 1216-A	metal		9-1/4	5-1/4	5-1/8	8-1/4
1	Mixer Rectifier, General Radio 874 MR	metal					1/3
1	Filter, General Radio 874F1000						

HIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Detector, General Radio DNT-3					

TRANSFER OSCILLATOR
MODEL 540B
(Hewlett-Packard Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment designed to extend the measurement range of electronic frequency counters. The equipment also provides signals for driving external amplifiers and mixers. Test results are displayed on the electronic counter.

RELATIONSHIP TO OTHER EQUIPMENT:

The transfer oscillator is used in conjunction with Electronic Counter Hewlett-Packard 524 series and Frequency Converter Hewlett-Packard 525 or equivalents.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The equipment is comprised of a high frequency mixer, a low frequency mixer, an oscillator, a harmonic generator, a video amplifier, a video output amplifier, a cathode follower output stage and a power supply.

Power Supply: 115 or 230 volts, AC, ±10%, 50 to 1000 cycles per second, approximately 110 watts.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO. :			
PROCUREM'T COG. :		DESIGN COG. :	Commercial
F. I. I. N. :		FUNCTIONAL CLASS. NO. :	7.3

TRANSFER OSCILLATOR
MODEL 540B
(Hewlett-Packard Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Range: 10 to 12, 400 megacycles per second.

Input Signal: Continuous wave, amplitude modulation, or pulse.

Accuracy (Continuous Wave): Approximately 1 part in 10, 000, 000.

Oscillator Fundamental Frequency Range: 100 to 220 megacycles per second.

Oscillator Harmonic Frequency Range: Greater than 12,400 megacycles per second.

Oscillator Stability: Less than 0.002% change per minute after 30 minute warmup.

Oscillator Dial Calibration: 1 megacycle per second increments ±0. 5%.

Oscillator Output: Approximately 2 volts into 50 ohms.

Amplifier Gain: 40 decibels, variable.

Amplifier Bandwidth: High frequency 3 decibel point, variable 1 kilomegacycle per second to 2 megacycles per second; low frequency 3 decibel point, switches 100 to below 10,000 cycles per second, variable to above 400 kilocycles per second.

Oscilloscope Frequency Range: 100 to 200, 000 cycles per second.

Oscilloscope Vertical Deflection Sensitivity: 5 millivolts per inch at mixer output.

Oscilloscope Horizontal Sweep: Internal, power supply frequency with phase control, external with 1 volt per inch, 20 to 5000 cycles per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Hewlett-Packard Company, 275 Page Mill Road, Palo Alto, California; Approximate Cost per Unit, $850.00.

TUBE COMPLEMENT:

None

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Transfer Oscillator Hewlett-Packard 540B					53

TRANSFER OSCILLATOR
MODEL 540B
(Hewlett-Packard Company)

QUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Transfer Oscillator Hewlett-Packard 540B	metal		12-1/2	20-3/4	15-1/4	42

424

425

ELECTRICAL & ELECTRONIC

TEST EQUIPMENT DATA HANDBOOK

VOLUME 8

TIME MEASURING AND COUNTING EQUIPMENT

8

FREDERICK RESEARCH CORPORATION
2601 UNIVERSITY BOULEVARD, WEST
WHEATON, MARYLAND

ELECTRICAL & ELECTRONIC

TEST EQUIPMENT DATA HANDBOOK

VOLUME 8

TIME MEASURING AND COUNTING EQUIPMENT

8

FREDERICK RESEARCH CORPORATION
2601 UNIVERSITY BOULEVARD, WEST
WHEATON, MARYLAND

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION

8. TIME MEASURING AND COUNTING EQUIPMENT

8.1	Range Calibrator
8.2	Chronoscope and Chronometer
8.3	Time Interval Measuring Equipment

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION - DEFINITIONS

8. TIME MEASURING AND COUNTING EQUIPMENT

An equipment used to indicate or measure time, and /or time intervals or to count the occurrence of events.

8. 1 RANGE CALIBRATOR

An equipment used to determine distance by means of time measurements of electromagnetic waves.

8. 2 CHRONOSCOPE AND CHRONOMETER

Instruments used to measure and/or integrate intervals of time.

8. 3 TIME INTERVAL MEASURING EQUIPMENT

A device designed to measure a predetermined interval of time from an arbitrary zero.

TABLE OF CONTENTS

Functional Classification	Designation	Name	
8.	TIME MEASURING AND COUNTING EQUIPMENT		
8.	Minneapolis-Honeywell UG 183A-1	Pulse Rate Indicating Tester	439
8. 1	RANGE CALIBRATORS		
8. 1	AN/SPM-6	Calibrator Set, Range	443
8. 1	AN/UPM-11	Range Calibrator Set	447
8. 1	AN/UPM-11A	Range Calibrator Set	451
8. 1	AN/UPM-40	Calibrator Set, Range	455
8. 1	I-233	Range Calibrator	459
8. 1	I-240	Calibrator	461
8. 1	TS-5/AP	Range Calibrator	465
8. 1	TS-10/APN	Test Set	469
8. 1	TS-10A/APN	Test Set	473
8. 1	TS-10B/APN	Test Set	477
8. 1	TS-10C/APN	Test Set	481
8. 1	TS-100/AP	Test Oscilloscope	485
8. 1	TS-102/AP	Range Calibrator	489
8. 1	TS-102A/AP	Range Calibrator	493
8. 1	TS-102B/AP	Range Calibrator	497
8. 1	TS-126/AP	Range Calibrator	501
8. 1	TS-142/APG	Calibrator	505
8. 1	TS-142A/APG	Calibrator	509
8. 1	TS-293/CPA-5	Range Calibrator	513
8. 1	TS-573/UP	Range Calibrator	517
8. 1	Missouri Research 312D	Range Calibrator	519
8. 1	Sickles III	Range Calibrator	521

TABLE OF CONTENTS (Continued)

Functional Classification		Designation	Name
8.2	CHRONOSCOPES AND CHRONOMETERS		
	8.2	Standard Electric S-10	Timer, Precision 527
8.3	TIME INTERVAL MEASURING EQUIPMENT		
	8.3	Berkeley 7250	Time-Interval Meter 533

ALPHA-NUMERICAL INDEX

Designation	Name	Functional Classification
AN/SPM-6	Calibrator Set, Range	8. 1
AN/UPM-11	Range Calibrator Set	8. 1
AN/UPM-11A	Range Calibrator Set	8. 1
AN/UPM-40	Calibrator Set, Range	8. 1
I-233	Range Calibrator	8. 1
I-240	Calibrator	8. 1
TS-5/AP	Range Calibrator	8. 1
TS-10/APN	Test Set	8. 1
TS-10A/APN	Test Set	8. 1
TS-10B/APN	Test Set	8. 1
TS-10C/APN	Test Set	8. 1
TS-100/AP	Test Oscilloscope	8. 1
TS-102/AP	Range Calibrator	8. 1
TS-102A/AP	Range Calibrator	8. 1
TS-102B/AP	Range Calibrator	8. 1
TS-126/AP	Range Calibrator	8. 1
TS-142/APG	Calibrator	8. 1
TS-142A/APG	Calibrator	8. 1
TS-293/CPA-5	Range Calibrator	8. 1
TS-573/UP	Range Calibrator	8. 1
Berkeley 7250	Time-Interval Meter	8. 3
Minneapolis-Honeywell UG 183A-1	Pulse Rate Indicating Tester	8.
Missouri Research 312D	Range Calibrator	8. 1
Sickles III	Range Calibrator	8. 1
Standard Electric S-10	Timer, Precision	8. 2

8. TIME MEASURING AND COUNTING EQUIPMENT

PULSE RATE INDICATING TESTER
UG183A-1
(Minneapolis-Honeywell Regulator Company)

FUNCTIONAL DESCRIPTION:

An overhaul test equipment to electrically check the output pulse characteristics of the RG7064A-1 Servo Amplifier. It is used to indicate the percent time on of the equipment output pulses. These pulses are recorded by means of a counter, from which the pulse rate may be determined. In addition, the average dwell time of the pulses may be determined by dividing the percent time on, as read directly on the meter, by the pulse rate in pulses per second.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Circuit includes a microammeter, an electrically operated Veeder-Root counter, drive relay, switches, resistors, capacitors, and associated fuses, jacks, and hardware.

Power Supply: 115 volts, AC, single-phase, 60 cycles per second.

Accuracy: ±2% of the indicated percent time on, irrespective of the pulse rate up to 25 pulses per second.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:	DESIGN COG.: Commercial		
F.I.I.N.:	FUNCTIONAL CLASS. NO.: 8.		
	- Electronics Test Equipment - M. Honeywell UG183A-1		

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

PULSE RATE INDICATING TESTER
UG183A-1
(Minneapolis-Honeywell Regulator Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Counter Range: Mechanical limitations of the counter limit the effective operating range of the pulse rate function to a maximum of 15 pulses per second.

MANUFACTURERS' OR CONTRACTORS' DATA:

Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

SHIPPING DATA:

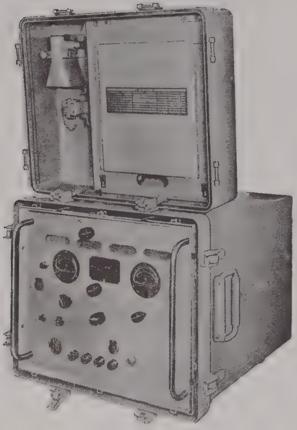
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Pulse Rate Indicating Tester Minneapolis-Honeywell UG183A-1			9	12	8	10

8.1 RANGE CALIBRATORS

CALIBRATOR SET, RANGE AN/SPM-6



FUNCTIONAL DESCRIPTION:

A portable, general purpose test set used to check the accuracy of the range indicators of radar systems operating in the 5.4 to 5.9 kilomegacycle band. The range calibrator can also be used to determine the delays present in the transmission lines of radar systems. The test set provides distance information by receiving a transmitted pulse, delaying it for a predetermined lenght of time, and retransmitting it to the radar. This in effect simulates a pulse reaching an object and being reflected to the radar.

RELATIONSHIP TO OTHER EQUIPMENT:

A Waveguide to type-N Adapter RC-49/U, a Waveguide Connector UG-149A/U and a Cable Receptacle UG-23B/U are required but not supplied.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The range calibrator circuit consists basically of a microwave input circuit, a delay line, IF amplifier, microwave output circuit, AFC

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuOrd	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	

CALIBRATOR SET, RANGE AN/SPM-6

ELECTROMECHANICAL DESCRIPTION: (Continued)

circuits, crystal-current measuring circuits, and power supply. The microwave circuit receives the RF input where it is mixed with a signal from a klystron oscillator. The resulting IF signal is delayed in the delay line circuit by a fused quartz rod which is vibrated as a result of piezoelectric effect. Mechanical waves traverse the length of the rod and are reflected back and forth in a succession of gradually attenuated output pulses. The output from the delay line is of low amplitude due to attenuation, therefore, it must be further amplified by the IF amplifier. The output of the amplifier is mixed with the klystron signal to produce an output signal of the same frequency as the input RF signal. The AFC circuits are used to provide automatic frequency control of the klystron. The crystal-current measuring circuits consist of two AC filtering and DC loading circuits in the input of the AFC amplifier and two more in the output stage of the IF amplifier. The crystal-current measuring circuits permit the relative current in any one of the four crystals of the mixer or modulator to be read on a panel meter. The power supply circuit furnishes five DC voltages and one biased sine wave sweep voltage in addition to the heater voltages.

Power Supply: 115 volts, AC, ±10%, 50 to 1000 cycles per second, single-phase, 250 watts.

Frequency Range: 5.4 to 5.9 kilomegacycles.

Power Output: 0.1 milliwatt peak.

Intermediate Frequency: 40 megacycles.

Range Characteristics: Odd multiples of 1800 yards; accuracy, ±5 yards delay.

RF Power Input: Variable; maximum signal, 10 watts peak; dynamic range, 25 decibels.

IF Amplifier Response: Center frequency, 40 megacycles; halfpower bandwidth 8.0 megacycles nominal.

MANUFACTURER'S OR CONTRACTOR'S DATA:

Sperry Gyroscope Company, Great Neck, Long Island, New York.

TUBE COMPLEMENT:

1 5661, 1 5726, 2 5814, 2 5829, 6 6005, 1 6115, 1 5U4GB, 7 5654/6AK5W, 2 6AK6, 1 6AL5W, 2 6AU6, 3 6X4W, 1 12AT7, 2 OA2, 1 TR361, 4 1N23BM.

REFERENCE DATA AND LITERATURE:

BuOrd OP 2156.

CALIBRATOR SET, RANGE AN/SPM-6

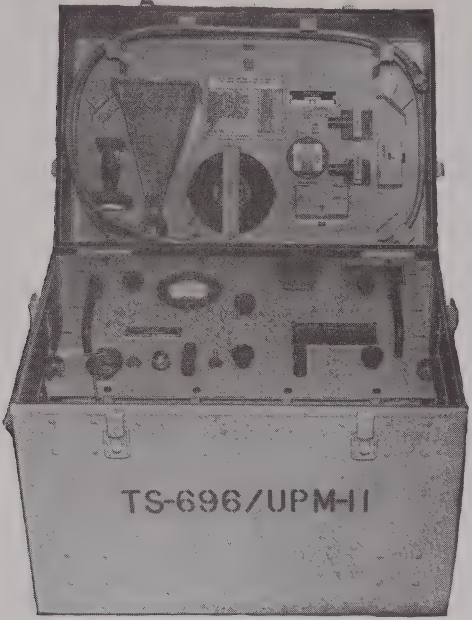
EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Calibrator Set, Range AN/SPM-6 Including:			13 5/8	16	20	97.5
1	Cord, Power CX-337/U			72 long			0.75
1	Horn, Pickup			3 1/8	2	4 1/8	0.25
1	Cable Assembly CG-92A/U			72 long			1
2	Crystal, Pair						
2	Allen Wrench						

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Calibrator Set, Range AN/SPM-6					

RANGE CALIBRATOR SET AN/UPM-11
(CALIBRATOR SET, RANGE, AN/UPM-11)



UNCTIONAL DESCRIPTION:

Portable equipment used for collimating the radar antenna and for accurately alibrating the radar range. It intercepts RF pulses from radar set being checked, elays them for accurately spaced time intervals, then retransmits them to give ynthetic echo indication to the radar set.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: The transmitted pulse from the radar set may be received by the simulator through either the horn or the directional coupler. This pulse is mixed with a signal from the local oscillator whose frequency is controlled automatically to be 40 megacycles higher than that of the incoming signal. The resultant IF pulse is delayed by a fixed, precise time interval in the fused quartz

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CSG-654721		
PROCUREM'T INFO.:	USAF Spec. No. WCEG-F-401		
PROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, Arm.
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	8.1
	- Electronics Test Equipment -		AN/UPM-11

s project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

RANGE CALIBRATOR SET AN/UPM-11
(CALIBRATOR SET, RANGE, AN/UPM-11)

ELECTROMECHANICAL DESCRIPTION: (Continued)

delay line. The output from the delay line is amplified and then mixed in t wave guide with the local oscillator signal. The resultant pulse is transmitt back through the horn or directional coupler to the radar set. The first pul appears at a range approximately equal to the range delay of the fused qua delay line of the calibrator, and each succeeding pulse appears at ranges a proximately equal to the odd numbered multiples of this range delay.

Power Supply: 115 volts, AC, single phase, 60 to 1600 cycles per second, 150 wat

Frequency Range: 8600 to 9500 megacycles per second.

Relay Period: Any range delays may be initiated if desired; the initial delay deper on the delay line selected. Three common delays used are 300 yards, 400 yarc and 1500 yards, (MX-1302/UPM-11, MX-1300/UPM-11, and MX-1301/UPM-1 respectively).

Accuracy: ±5 yards.

Repeatability of Readings: ±1 yard.

Temperature Range: -40° C. to +55° C., operating.
-65° C. to +85° C., non-operating.

Relative Humidity: 95% maximum operating.

MANUFACTURERS' OR CONTRACTORS' DATA:

Sperry Gyroscope Company, Great Neck, New York; Contract No. AF 33(038) a 22237, 29 June 1950, Approximate Cost per Unit, $3,340.87; 8 January 1952, A proximate Cost per Unit, $1944.13.

TUBE COMPLEMENT:

3 JAN-0A2, 1 JAN-5Y3GT, 1 JAN-6AU7, 1-387, 1 JAN-6Y3G, 1 JAN-5R4G 1 JAN-6AS7, 1 JAN-5829, 3 JAN-12AT7, 6 JAN-6AK5, 2 JAN-6J6, 1 JAN-2K2 4 1N21 (Crystal).

REFERENCE DATA AND LITERATURE:

TO 16-30UPM11-1 (Operation and Service Instructions).
TO 16-30UPM11-4 (Parts Catalog).
TO 16-30UPM11-101 (Wiring Change to Mixer Harness of Range Calibrator).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weig Pack (Lbs
			H	W	D	
1	Range Calibrator Set AN/UPM-11 (Domestic Package, Water Resistant Carton)	11.10	23	32-3/4	27	157

RANGE CALIBRATOR SET AN/UPM-11
(CALIBRATOR SET, RANGE, AN/UPM-11)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator Set AN/UPM-11		7CSG-654721	19	24	24	80 (complete)
1	Range Calibrator TS-696/UPM-11			17	22	18	45
1	Case CY-818/U	Aluminum		12	19	12	
1	Antenna Horn AT-273/UPM			5-5/64	3-5/16	8-3/4	
1	Coaxial to Waveguide Adapter UG-591/U						
1	Power Cable Assembly CX-1490/U			172 long			
1	Cord CG-252A/TPS-10			96 long			
2	Lamp						
10	Fuse						
2	Wrench						
1	Clamp UG-590/U						
1	Coaxial to Waveguide Adapter UG-592/U						
1	Twisted Waveguide						
1	Measuring Tape TL-598/U			30 yds.long			
1	Spare Delay Line						

RANGE CALIBRATOR SET AN/UPM-11A

FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used with a directional horn for collimating radar antennas with the radar axes, and for accurately calibrating ranging circuits by connecting directly to the radar with a directional coupler and coaxial cable. It intercepts radio frequency pulses from the radar set under test, delays them for accurately spaced time intervals, and retransmits them to the radar set, in a series of simulated target echoes. The radar set indicates the range information it receives from the range calibrator. This information is compared to the accurately known ranges assigned to the simulated target echoes by the range calibrator. For horn operation, a steel tape calibrated in yards is supplied to measure the distance from the radar antenna to the simulator. In addition, this set provides a simulated radar beacon response. Indication for this equipment is provided by a panel meter for checking its own B+ and B- voltages and crystal currents. Delay lines used with the range calibrator determine the ranges assigned to the simulated target echoes.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-170276-75		
PROCUREM'T INFO.: Spec. MIL-C-4372(USAF) and Am. 1 dated 28 May 1952			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, Arm.	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
- Electronics Test Equipment -			AN/UPM-11A

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RANGE CALIBRATOR SET AN/UPM-11A

RELATIONSHIP TO OTHER EQUIPMENT:

This set is electrically and mechanically interchangeable with Range Calibrator Set AN/UPM-11, except for its added function of simulating a radar beacon response.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Transmitted radar pulses are received by the range calibrator through either the antenna horn or the directional coupler. Each pulse is mixed with a signal from the local oscillator whose frequency is controlled automatically to be 40 megacycles per second from that of the incoming signal. The resultant IF pulse is delayed by a fixed, precise time interval in the fused quartz delay line. Output from the delay line is amplified and then mixed in the waveguide with the local oscillator signal. This resultant pulse is transmitted back through the horn or directional coupler to the radar set. The first pulse appears at a range approximately equal to the range delay of the fused quartz delay line of the calibrator. Each succeeding pulse appears at a range approximately equal to the odd numbered multiples of this range delay.

In addition, a crystal controlled simulated radar beacon response is available at a fixed frequency.

Power Supply: 115 ±5 volts, AC, 50 to 1000 cycles per second, single phase, 250 watts.

Frequency Range: 8600 to 9500 megacycles per second.

Beacon Frequency: 9310 megacycles per second, fixed.

Type of Transmission: Pulses.

Input Data:

Power: 5 to 250 kilowatts peak.

Pulse Width: 0.3 to 3.0 microseconds.

Pulse Repetition Rate: 300 to 3000 pulses per second.

Duty Cycle Product: 0.0006 to 0.0012 average.

Delay Period: Any range delay can be initiated as desired up to the full range of the calibrator. The initial delay depends on the delay time of the delay line selected. Three USAF approved delay lines and their corresponding delay times expressed in range are as follows: MX-1302/UPM-11, 300 yards; MX-1300/UPM-11, 400 yards; MX-1301/UPM-11, 1500 yards.

Maximum Range: 35,000 yards.

Repeatability of Readings (same radar system): ±1 yard.

Output Termination: (1) Coaxial Cable for connection to radar directional coupler.
(2) Horn (20 degree beam).

Accuracy: ±5 yards at zero range.

Temperature Range: -40°C. to +55°C., operating. -65°C. to +85°C., storage.

Humidity Range: Up to 95% relative, operating or storage.

RANGE CALIBRATOR SET AN/UPM-11A

MANUFACTURERS' OR CONTRACTORS' DATA:

Sperry Gyroscope Company, Great Neck, New York; USAF Contract AF 33(604)-5732; Approximate Cost per Unit, $4,300.00, dated 3 February 1954.

Farnsworth Electronics Company (formally Capehart-Farnsworth Corporation), Fort Wayne, Indiana; USAF Contract AF 33(604)5819; Approximate Cost per Unit, $1,800.00.

TUBE COMPLEMENT:

(AN/UPM-11A Manufactured by Farnsworth): 1 JAN-6J4, 5 JAN-6096, 1 JAN-6097, 7 JAN-12AT7, 2 JAN-5725, 1 JAN-5R4WGY, 1 JAN-5Y3GT, 1 JAN-6080, 1 JAN-6AU6, 3 JAN-OA2, 1 JAN-5727, 1 JAN-1B63A, 2 JAN-2K25, 4 JAN-1N23C, 1 JAN-1N23CR.

(AN/UPM-11A Manufactured by Sperry): 2 JAN-6J6, 6 JAN-6AK5, 3 JAN-CK5828, 4 JAN-12AT7, 3 JAN-OA2, 1 JAN-5Y3GT, 1 JAN-5R4GY, 1 JAN-6AS7G, 1 JAN-6AU6, 1 JAN-3H7, 2 JAN-2K25, 1 JAN-6095, 1 JAN-2D21W, 1 JAN-12AX7, 1 JAN-6AS6.

REFERENCE DATA AND LITERATURE:

33A1-10-3-1 (Operation and Service Instructions - Farnsworth).
33A1-10-3-4 (Illustrated Parts Breakdown - Farnsworth).
33A1-10-3-11 (Operation and Service Instructions - Sperry).
33A1-10-3-14 (Illustrated Parts Breakdown - Sperry).

SHIPPING DATA:

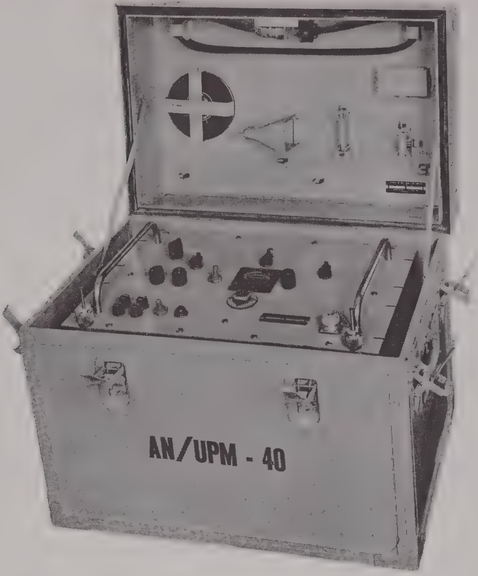
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Range Calibrator Set AN/UPM-11A (Domestic Package, Water Resistant Carton)	11.1	23	32-3/4	27	167

RANGE CALIBRATOR SET AN/UPM-11A

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator Set AN/UPM-11A	Aluminum	7CAC-170276-75	15	22	19	110
	Including:						
1	Range Calibrator TS-738A/ UPM-11A	Aluminum		12-1/4	19	16	60
1	Transit Case CY-818/U (FAR-900714-1)	Aluminum		15	22	19	
1	Power Cable Assembly CX-1490/U			180 long			
1	Cord CG-252A/TPS-10 (Far-702169G1)			96 long			
1	Antenna Horn AT-273/UPM (FAR-801268-1)	Aluminum		5-5/64	8-3/4	3-5/16	
1	Coaxial to Waveguide Adapter UG-591/U						
1	Coaxial to Waveguide Adapter UG-592/U						
1	Waveguide Assembly CG-673/U			3-5/8 long			
1	Measuring Tape TL-598/U and Case	Plastic		1188 long			
1	Clamp UG-590/U						

CALIBRATOR SET, RANGE AN/UPM-40



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used with a directional horn for collimating radar antennas with the radar axis, and for accurately calibrating ranging circuits by connecting directly to the radar with a directional coupler and coaxial cable. The equipment intercepts radio frequency pulses from the radar set under test, delays the pulse for an accurately spaced time interval, and retransmits them to the radar set in a series of simulated target echoes. Information received from the range calibrator is indicated on the radar set under test.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Range Calibrator Set AN/UPM-11A except for frequency range of operation.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The transmitted pulse from the radar set under test is received by the test equipment through either the horn or the directional coupler.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.		Standard	
STOCK NOS.			
PROCUREM'T INFO.: Dwg 5224-90924			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
- Electronics Test Equipment -			AN/UPM-40

CALIBRATOR SET, RANGE AN/UPM-40

ELECTROMECHANICAL DESCRIPTION: (Continued)

The received signal is heterodyned in a balanced crystal mixer with a signal from the range calibrator local oscillator to produce an intermediate frequency signal. The intermediate frequency signal is delayed by a precise fixed time interval in the fused quartz delay line. The output from the delay line is amplified and then heterodyned with the local oscillator signal in a balanced modulator. The resultant signal is transmitted to the radar set to simulate an echo signal.

Power Supply: 115 volts ±10%, AC, 60 to 800 cycles per second, 155 watts.
Frequency Range: 23. 5 to 24. 5 kilomegacycles per second.
Radio Frequency Input:
 Power: 120 watts peak, maximum.
 Dynamic Range: 18 decibels.
Range Delay: Odd multiples of 500 yards.
Range Delay Accuracy: ±5 yards.
Temperature Range: -10°C to +45°C.

MANUFACTURERS' OR CONTRACTORS' DATA:

Sperry Gyroscope Company, Division of Sperry Rand Corporation, Great Neck, Long Island, New York; Contract No. AF 33(038)6663.

TUBE COMPLEMENT:

8 6AK5, 3 12AU7, 1 6AS6, 2 6AL5, 1 12AT7, 3 6X4, 4 6AQ5, 2 6AU6, 1 5651, 1 OA2, 1 5Y3.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog 23. 250, November 1952.

SHIPPING DATA:

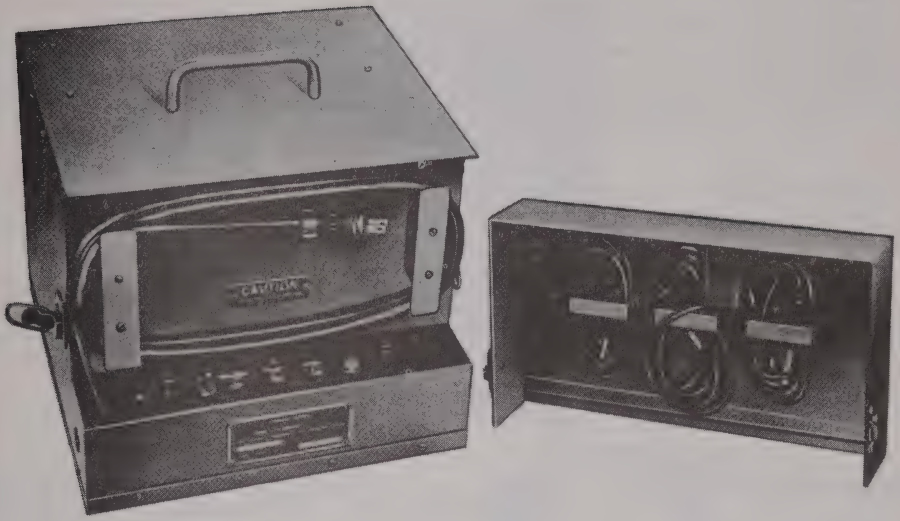
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Calibrator Set, Range AN/UPM-40					

CALIBRATOR SET, RANGE AN/UPM-40

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Calibrator Set, Range AN/UPM-40	metal		14	20-1/4	12-1/2	47
1	Transit Case	metal		18	23-1/2	15-1/2	33
1	RF Connector UG-210/U						
1	Flexible Waveguide						
1	Adapter						
1	Pickup Horn						
1	Antenna AT-158/U						
1	Power Cable CX-337/U						

RANGE CALIBRATOR I-233



FUNCTIONAL DESCRIPTION:

A portable, special purpose, range calibrator which provides three outputs to facilitate adjustment and checking of the range measuring circuits of IFF equipment. It has a recessed panel with a permanently attached power cord, three output jacks, a power ON-OFF switch, two fuses (one spare), and an indicator lamp. Three output cables are provided which plug into the respective output jacks and into the range measuring circuits of the prime equipments. Indications are provided on the prime equipments.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to I-223-A except the marker output-pips are repeated 163,940 times per second and correspond to a range separation of 1000 yards in the I-223-A.

Used in testing Radio Sets BN-2, RC-127-A, 350, and 351.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-170276-1652		2C638
PROCUREM'T INFO.:			
PROCUREM'T COG.: Army		DESIGN COG.: Army, ESL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
- Electronics Test Equipment -			I-233

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RANGE CALIBRATOR I-233

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 117.5 volts, AC, 50 to 60 cycles per second, single phase, 40 watts.

Output Signals:

Sine Wave at 186.30 kilocycles per second.

Synchronizing pulse with a repetition rate of approximately 240 pulses per second.

Pulses repeated 186,300 times per second, having rise time of approximately 0.25 microseconds; these correspond to a range separation of 0.5 mile between pulses.

MANUFACTURERS' OR CONTRACTORS' DATA:

Belmont Radio Corporation, Chicago, Illinois; Army Contract No. W-2279-sc-829.

TUBE COMPLEMENT:

1 JAN-5Y3GT, 1 JAN-6SN7GT, 1 JAN-6L6G, 1 JAN-6V6GT, 1 JAN-6SJ7.

REFERENCE DATA AND LITERATURE:

TO 16-55-329 (Spare Parts List).

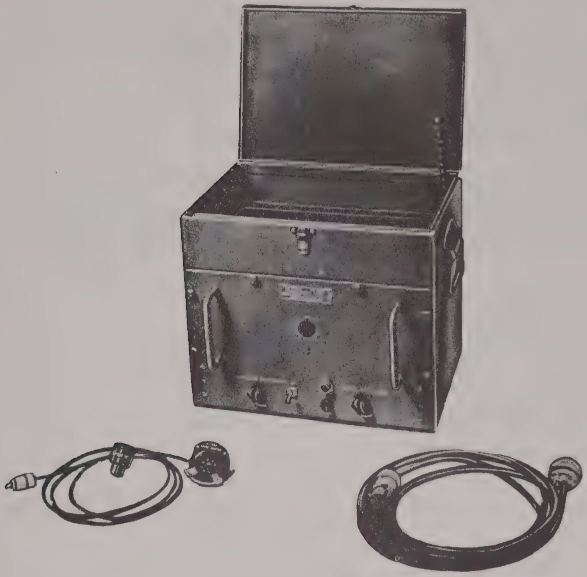
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches) H	W	D	Weight Packed (Lbs.)
1	Range Calibrator I-233 (Export Packed)	1.275				47

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches) H	W	D	Weight (Lbs.)
1	Range Calibrator I-233 Including:	Sheet Metal	7CAC-170276-1652 2C638	9-3/4	12-1/4	11-3/4	31
1	Cable Assembly		7CBN-B20161A N17-C-48231-2101 3E7144-1	72 long			
1	Cord CD-1099		1800-322014127 N17-L-63341-8501 3E1999-99	72 long			
1	Cord CD-1101		7CAC-170270-1426 N17-L-63341-8510 3E1999-101	72 long			

CALIBRATOR I-240
(CALIBRATOR, FREQUENCY, I-240)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, test set used to calibrate the frequency of range marker oscillators of radar sets. Calibration is effected by the comparison of the phase relationship of an internally generated sine wave and the input signal on a cathode ray tube. When the input frequency is the same as the internally generated frequency, then a circle, an elipse, or a straight line is seen on the cathode ray tube.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The magnetostriction oscillator generates the sweep voltage for the cathode ray tube. A filter network smooths out irregularities in the waveshape of the oscillator output and feeds a sine-wave voltage to the horizontal plates of the cathode ray tube.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			3F5790-240
PROCUREM'T INFO.:	Spec. No. MIL-C-11170 (SigC)		
PROCUREM'T COG.:	Army	DESIGN COG.:	Army, ESL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	8.1
	- Electronics Test Equipment -		I-240

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

CALIBRATOR I-240
(CALIBRATOR, FREQUENCY, I-240)

ELECTROMECHANICAL DESCRIPTION: (Continued)

The input signal is amplified and smoothed out to a sine wave and feeds it to the vertical deflection plates of the cathode ray tube.

Power Supply: 105 to 125 volts, AC, 60 to 1200 cycles per second, single phase.
Oscillator Frequency: 18,624 cycles per second, fixed.
Type of Reception: Square Wave.
Accuracy: ±5 cycles per second at 68° F.

MANUFACTURERS' OR CONTRACTORS' DATA:

Whiting and Davis Company, Plainville, Massachusetts; Army Order No. 936-MPD45, dated 10 October 1944; Approximate Cost per Unit, $378.00.

TUBE COMPLEMENT:

2 JAN-6SJ7, 2 JAN-6X5GT, 1 RCA Type 913.

REFERENCE DATA AND LITERATURE:

TO 16-40I240-5 (TM 11-1226) (Instruction Book).
TO 16-55-176 (Spare Parts List).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Calibrator I-240 (Domestic Packed)	2.3				69

CALIBRATOR I-240
(CALIBRATOR, FREQUENCY, I-240)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Calibrator I-240	Steel	3F5790-240	13-3/4	14-1/2	10-1/2	40
1	Magneto-striction Unit MX-213/U		2C714				
1	Cord CD-1242		1F432-1242	72 long			0.5
1	Adapter MC-533		2Z295-533				
1	Plug PL-259		8850-460402 2Z7226-259				
1	Cord, AC Power Cable		8800-257200 1B6814-2	120 long			0.5

RANGE CALIBRATOR TS-5/AP
(CALIBRATOR, RANGE, TS-5/AP)

UNCTIONAL DESCRIPTION:

A portable test equipment used to calibrate the range scale of the indicators as-
ociated with radar systems such as the 500 and 700 series. It is designed to cali-
rate range scales from 1 to 100 nautical or statute miles.

ELATIONSHIP TO OTHER EQUIPMENT:

LECTROMECHANICAL DESCRIPTION:

ircuit Information: Upon receipt of a trigger pulse from the radar, the calibrator circuit generates a series of spaced marker pulses which are shaped into pips, amplified and delivered into the radar indicator. The calibrator will operate from either positive or negative trigger pulses.

ower Supply: 115 volts, ±10%, AC, single phase, 50 to 1200 cycles per second, 0.4 amperes approximately.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-170276-15	R16-AN-TS-5/AP	3F2445-5AP
PROCUREM'T INFO.:	USAF Spec. No. 71-1745		
PROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, ARL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	8.1
	- Electronics Test Equipment -		TS-5/AP

project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RANGE CALIBRATOR TS-5/AP
(CALIBRATOR, RANGE, TS-5/AP)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Frequency Range: Video.
Type of Transmission: Pulse.
Type of Reception: Pulse.
Input Radar Trigger Pulse: 1 to 50 volts positive or negative.
Input Impedance: 72 ohm or high impedance.
Positive Marker Pulse Width: 0.5 microseconds.
Positive Marker Pulse Spacing: 1/4, 1, 5, or 10 nautical or statute miles.
Pulse Amplitude: 5 volts across 72 ohm load (all ranges), 35 volts across 1000 ohms load (1/4 mile range). 50 volts across 1000 ohms load (1, 5, 10 mile ranges).
Pulse Repetition Rate: 400 to 2000 pips per second.
Accuracy: ±2% marker pulse spacing.
Temperature Range: -40° to +120° F.

MANUFACTURERS' OR CONTRACTORS' DATA:

Western Electric Company, 120 Broadway, New York, New York; Approximate Cost per Unit, $125.00.

TUBE COMPLEMENT:

3 JAN-6SN7GT, 1 JAN-6AG7, 1 JAN-6X5GT/G.

REFERENCE DATA AND LITERATURE:

TO 16-55-344 (Spare Parts).
TM 11-1054 (Technical Manual).

SHIPPING DATA:

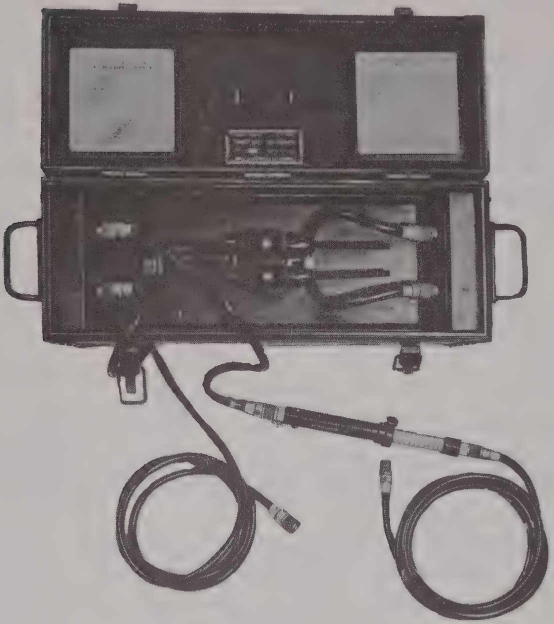
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Range Calibrator TS-5/AP (Export Package)	1.60	17	13	12	47

RANGE CALIBRATOR TS-5/AP
(CALIBRATOR, RANGE, TS-5/AP)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator TS-5/AP Including:	Steel	7CAC-170276-15 R16-AN-TS-5/AP 3F2445-5AP	13	10-1/4	9-1/2	
1	Power Cable CX-5/AP		1600-323756125 R16-AN-CS-5/AP 3E4036-240-2	240 long			
2	Coaxial Cable CX-4/AP		3300-132335582 R16-AN-CX-4/AP 1F425-8.72	72 long			
4	Adapter		7CWX-FS0693983-1 2ZK308	2-1/8	1		
1	Technical Manual TM 11-1054						
1	Fuse, FU-26		8800-361200 3Z1926				
						Total:	28

TEST SET TS-10/APN
(TEST SET, RADAR, TS-10/APN)



FUNCTIONAL DESCRIPTION:

A portable delay line test set used for testing radio altimeter equipments. It can be used in range calibration tuning and, to a limited extent, in determining the loop sensitivity. Checks for microphonic tubes, transmitter tube performance and regulator tube performance test can be made. This set cannot be used for detector tuning and balance, or to check the limit lights by varying the attenuator because the tracking of the lights and altitude indicator will not be correct.

RELATIONSHIP TO OTHER EQUIPMENT:

TS-10/APN, TS-10A/APN, TS-10B/APN, and TS-10C/APN are functionally the same and in some instances are used in conjunction with TS-16/APN and TS-23/APN.

TS-10/APN and TS-10A/APN have disclosed a progressive deterioration of the transmission characteristic of the delay coils resulting in errors in sensitivity evaluations. This difficulty has been corrected in the TS-10C/APN.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	1690-327868000		3F4325-10
PROCUREM'T INFO.: Spec. No. 271-1704			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
- Electronics Test Equipment -			TS-10/APN

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

TEST SET TS-10/APN
(TEST SET, RADAR, TS-10/APN)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of self-contained, passive electrical circuits that convey a signal from altimeter transmitter to the receiver and introduces a definite time delay, corresponding to the transmission time required for an actual signal to reach the ground surface and be reflected to the aircraft receiver. The test set also includes an adjustable attenuator which introduces a signal loss equivalent to actual signal loss in flight and provides a method of checking loop sensitivity and tuning.

Power Supply: None required.

Frequency Range: 420 to 460 megacycles per second nominal, 440 megacycles per second center.

Delay Periods: 65, 297, and 350 feet.

Attenuation: 31 decibels, two delay lines in series.

Impedance: 50 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

RCA Victor Division, Camden, New Jersey; Order No. 9670-WF-43, 22 June 1948; Approximate Cost per Unit, $334.00; Order No. 11948-WF-43, 15 June 1943; Approximate Cost per Unit, $253.90.

Electronics Corporation of America, 45 W. 18th Street, New York, New York; Order No. 12185-43, 9 May 1944; Approximate Cost per Unit, $265.31; Order No. 737-44, 9 October 1944; Approximate Cost per Unit, $180.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-35TS10-3 (Maintenance Instructions).
TO 16-55-185 (Spare Parts List).

SHIPPING DATA:

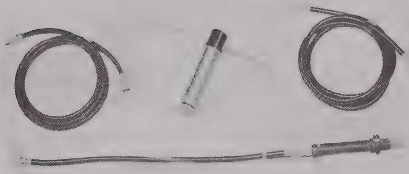
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set, TS-10/APN, with accessories (Domestic Package - Water Resistant Carton)	3.06	25	11	19-3/4	70

TEST SET TS-10/APN
(TEST SET, RADAR, TS-10/APN)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Delay Unit consisting of Short Coil Assembly CA-104, Long Delay Coil Assembly CA-105 in Carrying Case	Wood	1690-327868000 3F4325-10	19-3/4	7-1/2	16-1/2	42
1	Attenuator L-101		7CAC-PA278135-502 2Z396-7				
1	Cord Assembly CD-800		7CAC-170265-48 1F430-108.20	20 long			
2	Cord Assembly CD-800		7CAC-170265-49 1F430-108.96	96 long			
1	Cord Assembly CG-108/APN		7CAC-170265-495 1F430-108.12	12 long			
2	Indicator I-101		7CAC-526239 3F2877-113				
2	Spare Lamp I-102		7CRC-PA278135-502 2Z396-7				
						Total:	42

TEST SET TS-10A/APN
(TEST SET, RADAR, TS-10A/APN)



FUNCTIONAL DESCRIPTION:

A portable delay line test set used for testing radio altimeter equipments. It can be used in range calibration tuning and, to a limited extent, in determining the loop sensitivity. Checks for microphonic tubes, transmitter tube performance and regulator tube performance test can be made. This set cannot be used for detector tuning and balance, or to check the limit lights by varying the attenuator because the tracking of the lights and altitude indicator will not be correct.

RELATIONSHIP TO OTHER EQUIPMENT:

TS-10/APN, TS-10A/APN, TS-10B/APN, and TS-10C/APN are functionally the same and in some instances are used in conjunction with TS-16/APN and TS-23/APN.

TS-10/APN and TS-10A/APN have disclosed a progressive deterioration of the transmission characteristic of the delay coils resulting in errors in sensitivity evaluations. This difficulty has been corrected in the TS-10C/APN.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-801319-2375		3F4325-10A
PROCUREM'T INFO.: Spec. No. 271-1704-A			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
- Electronics Test Equipment -			TS-10A/APN

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

TEST SET TS-10A/APN
(TEST SET, RADAR, TS-10A/APN)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of self-contained, passive electrical circuits that convey a signal from altimeter transmitter to the receiver and introduces a definite time delay, corresponding to the transmission time required for an actual signal to reach the ground surface and be reflected to the aircraft receiver. The test set also includes an adjustable attenuator which introduces a signal loss equivalent to actual signal loss in flight and provides a method of checking loop sensitivity and tuning.

Power Supply: None required.

Frequency Range: 420 to 460 megacycles per second nominal, 440 megacycles per second center.

Delay Periods: 65, 297, and 350 feet.

Attenuation: 31 decibels, two delay lines in series.

Impedance: 50 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:

RCA Victor Division, Camden, New Jersey; Order No. 12208-WF-43, 17 June 1943; Approximate Cost per Unit, $247.70; Order No. 589-DAY-44, 25 January 1944; Approximate Cost per Unit, $230.00.

Electronics Corporation of America, 45 W. 18th Street, New York, New York; Order No. 893-DAY-44, 11 October 1944; Approximate Cost per Unit, $180.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-35TS10-3 (Maintenance Instructions).
TO 16-55-185 (Spare Parts List).

SHIPPING DATA:

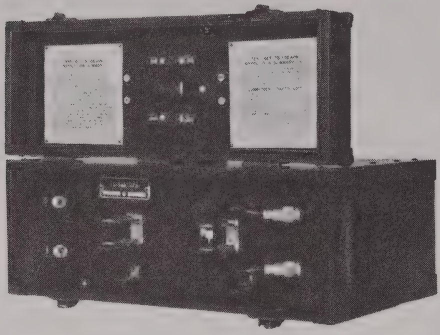
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set, TS-10A/APN, with accessories (Domestic Package - Water Resistant Carton)	3.06	25	11	19-3/4	70

TEST SET TS-10A/APN
(TEST SET, RADAR, TS-10A/APN)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Delay Unit Consisting of CA-101A Short Delay Coil Assembly CA-105A Long Delay Coil Assembly		7CAC-801319-2375 3F4325-10A	19-3/4	7-1/2	16-1/2	
1	Attenuator L-101-A		7CAC-PA278135-502 2Z396-7				
1	Cord Assembly CD-800		7CAC-170265-48 1F430-108.20	20 long			
2	Cord Assembly CD-800		7CAC-170265-49 1F430-108.96	96 long			
1	Cord Assembly CG-108/APN		7CAC-170265-495 1F430-180.12	12 long			
2	Indicator I-101		7CAC-526239 3F2877-113				
1	Spare Lamp I-102		7CRC-PA278135-502 2Z396-7				
						Total:	42.0

TEST SET TS-10B/APN
(TEST SET, RADAR, TS-10B/APN)



FUNCTIONAL DESCRIPTION:

A portable delay line test set used for testing radio altimeter equipments. It can be used in range calibration tuning and, to a limited extent, in determining the loop sensitivity. Checks for microphonic tubes, transmitter tube performance and regulator tube performance tests can be made. This set cannot be used for detector tuning and balance, or to check the limit lights by varying the attenuator because the tracking of the lights and altitude indicator will not be correct.

RELATIONSHIP TO OTHER EQUIPMENT:

TS-10/APN, TS-10A/APN, TS-10B/APN, and TS-10C/APN are functionally the same and in some instances are used in conjunction with TS-16/APN and TS-23/APN.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of self-contained, passive electrical circuits that convey a signal from altimeter transmitter to the receiver and introduces a definite

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-801319-242		3F4325-10B
PROCUREM'T INFO.:	Spec. No. 271-1704-A		
PROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, ARL
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	8.1
	- Electronics Test Equipment -		TS-10B/APN

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Betheada, Md. - Multilithed in U. S. A.

TEST SET TS-10B/APN
(TEST SET, RADAR, TS-10B/APN)

ELECTROMECHANICAL DESCRIPTION: (Continued)

time delay, corresponding to the transmission time required for an actual signal to reach the ground surface and be reflected to the aircraft receiver. The test set also includes an adjustable attenuator which introduces a signal loss equivalent to actual signal loss in flight and provides a method of checking loop sensitivity and tuning.

Power Supply: None required.

Frequency Range: 420 to 460 megacycles per second nominal, 440 megacycles per second center.

Delay Periods: 65, 297, and 350 feet.

Accuracy:
- Range Calibration: ±2%.
- Sensitivity: ±4%.

Attenuation: 31 decibels, two delay lines in series.

Impedance: 50 ohms.

Temperature Range: -54° C. to +50° C.

Relative Humidity Range: Up to 90%.

Barometric Pressure Range: 20 to 30 inches of mercury.

MANUFACTURERS' OR CONTRACTORS' DATA:

Electronics Corporation of America, 45 W. 18th Street, New York, New York; Order No. 1320-DAY-44; Approximate Cost per Unit, $180.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

TO 16-35TS10-3 (Maintenance Instructions).

TO 16-55-185 (Spare Parts List).

SHIPPING DATA:

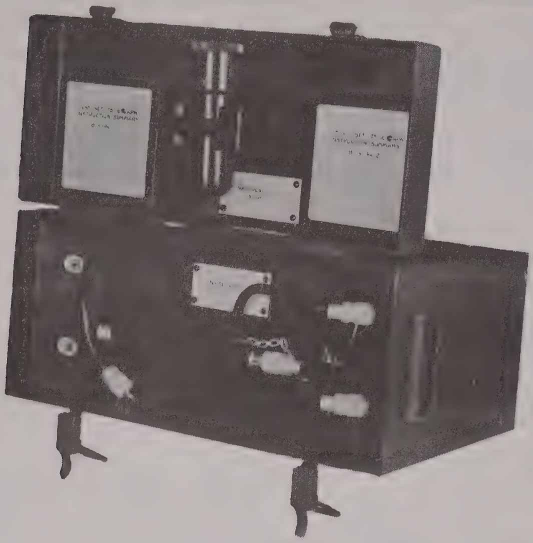
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set, TS-10B/APN, with accessories (Export Packed, Water Resistant Carton)	3.46	26	11-1/2	20	80

TEST SET TS-10B/APN
(TEST SET, RADAR, TS-10B/APN)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Delay Unit Consisting of CA-101A Short Delay Coil Assembly and CA-105A Long Delay Coil Assembly		7CAC-801319-242 3F4325-10B	19-3/4	7-1/2	16-1/2	
1	Attenuator L-101-A		7CAC-PA278135-502 2Z396-7	7-1/2 closed			
1	Cord Assembly CA-103		1800-322850548 3EK6016-20	20 long			
2	Cord Assembly CG-102		1800-321855360 3E1800-96	96 long			
1	Cord Assembly CA-101		1800-321855312 3E1800-12	12 long			
1	Indicator ID-98/APN		7CAC-526243 3F2877-98	7-1/8 long	1-1/2 dia.		
2	Spare Lamp I-102		7CRC-PA278135-502 2Z396-7	15/16	7/16 dia.		
						Total:	42.0

TEST SET TS-10C/APN
(TEST SET, RADAR, TS-10C/APN)



FUNCTIONAL DESCRIPTION:

A portable delay line test set used for testing radio altimeter equipments. It can be used in range calibration tuning and, to a limited extent, in determining the loop sensitivity. Checks for microphonic tubes, transmitter tube performance and regulator tube performance tests can be made. This set cannot be used for detector tuning and balance, or to check the limit lights by varying the attenuator because the tracking of the lights and altitude indicator will not be correct.

RELATIONSHIP TO OTHER EQUIPMENT:

TS-10/APN, TS-10A/APN, TS-10B/APN, and TS-10C/APN are functionally the same and in some instances are used in conjunction with TS-16/APN and TS-23/APN.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Consists of self-contained, passive electrical circuits that convey a signal from altimeter transmitter to the receiver and introduces a definite

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-801319-238		3F4325-10C
PROCUREM'T INFO.:	Spec. No. 271-1704-A		
PROCUREM'T COG.:	USAF	DESIGN COG.: USAF, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
	- Electronics Test Equipment -		TS-10C/APN

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

TEST SET TS-10C/APN
(TEST SET, RADAR, TS-10C/APN)

ELECTROMECHANICAL DESCRIPTION: (Continued)
time delay, corresponding to the transmission time required for an actual signal to reach the ground surface and be reflected to the aircraft receiver. The test set also includes an adjustable attenuator which introduces a signal loss equivalent to actual signal loss in flight and provides a method of checking loop sensitivity and tuning.

Power Supply: None required.

Frequency Range: 420 to 460 megacycles per second nominal, 440 megacycles per second center.

Delay Periods: 65, 297, and 350 feet.

Attenuation: 31 decibels, two delay lines in series.

Impedance: 50 ohms.

MANUFACTURERS' OR CONTRACTORS' DATA:
Atlas Instrument Company, Haddonfield, New Jersey; Order No. 371-DAY-45, 22 January 1945; Approximate Cost per Unit, $183.10.

TUBE COMPLEMENT:
None.

REFERENCE DATA AND LITERATURE:
TO 16-35TS10-3 (Maintenance Instructions).
TO 16-55-185 (Spare Parts List).

SHIPPING DATA:

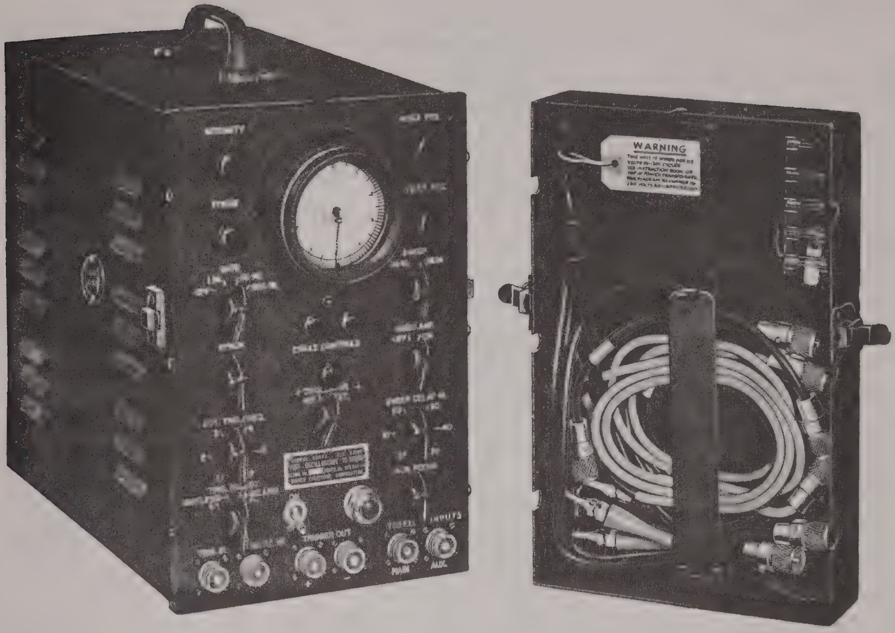
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Set, TS-10C/APN, with accessories (Shelf Package, Water Resistant Carton)					

TEST SET TS-10C/APN
(TEST SET, RADAR, TS-10C/APN)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Delay Unit Containing CA-101A Short Delay Coil Assembly and CA-105A Long Coil Assembly		7CAC-801319-238 3F4325-10C	16	6-1/2	13-1/2	
1	Attenuator L-101-A		7CAC-PA278135-502 2Z396-7				
1	Cord Assembly CG-108/APN		7CAC-170265-48 1F430-108.20	20 long			
2	Cord Assembly CG-108/APN		7CAC-170265-49 1F430-108.96	96 long			
1	Cord Assembly CG-108/APN		7CAC-170265-495 1F430-108.12	12 long			
1	Indicator ID-98A/APN		7CAC-526241 3F2877-98A				
2	Spare Lamp I-102		7CRC-PA278135-502 2Z396-7				
						Total:	38

TEST OSCILLOSCOPE TS-100/AP
(OSCILLOSCOPE TS-100/AP)



FUNCTIONAL DESCRIPTION:

A small ground portable instrument used to test and to calibrate range measuring circuits of radar systems. It may also be used as a general synchroscope. It is used for viewing short video pulses on three-inch screen and for measuring time intervals between pulses. All controls and connections are on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Equipment required but not supplied when used for Radar Equipment AN/APS-15A only: Test Load Unit TS-101/AP, Cord CX-237/U.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 115 or 230 volts, ±10%, 50 to 1200 cycles per second, single pulse, 110 watts at 60 cycles per second, 95% power factor.

Trigger Input:

Pulse Repetition Rate: 100 to 3000 pulses per second for 1, 30, and 350 mile undelayed sweeps.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-612150	R16-AN-TS-100/AP	3FK3660-100
PROCUREM'T INFO.: USAF Spec. No. 271-5070			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, Arm.	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
- Electronics Test Equipment -			TS-100/AP

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A

TEST OSCILLOSCOPE TS-100/AP
(OSCILLOSCOPE TS-100/AP)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Pulse Amplitude: 15 to 150 volts positive.
25 to 150 volts negative.

Rise Time: 100 volts per microsecond.

Input Impedance: 240,000 ohms paralleled by a 38 micromicrofarad capacitor t positive trigger. 27,000 ohms paralleled by a 38 micromicrofarad capacitor to negative trigger.

Trigger Output:

Pulse Repetition Rate: 300 to 1500 pulses per second.

Minimum Amplitude: +100 volts: -70 volts.

Maximum Duration: 1.25 microseconds.

Rise Time: 100 volts per 0.2 microsecond.

Sweeps:

Circular: 2000 yards; 1 mile, 30 miles, or 350 miles.

Linear: 1 mile, 30 miles, or 350 miles.

Sweep Delay: 0.9 to 50 miles.

Internal Crystal Oscillator Frequency: 80.86 kilocycles per second, ±10 cycles pe second at 25° C.

Video:

Frequency Response: Within 3 decibels from 250 cycles per second to 2. megacycles.

Gain: 12 (minimum).

Undistorted: +2 volts, -3.5 volts.

Input Impedance: One megohm paralleled by 40 micromicrofarads.

Range Accuracy: ±0.03 microsecond with circular sweep.

Sensitivity: Signal Voltage: 225 volts per inch for a 2-1/4 inch circle.
Deflection Voltage: 150 volts per inch.

Pulses Observable: Duration: 0.1 to 4300 microseconds.
Polarity: Positive or negative.
Amplitude: 1 to 300 volts.

Temperature Limits: -30° C. to +50° C.

Maximum Relative Humidity: 95%.

MANUFACTURERS' OR CONTRACTORS' DATA:

United Cinephone Corporation, Torrington, Connecticut; Contract No. 520-44 22 May 1944; Approximate Cost per Unit, $582.12; Contract No. 14-45RA, 8 December 1944; Approximate Cost per Unit, $499.61; Contract No. 2072-45AR, 31 Marc 1945; Approximate Cost per Unit, $465.00; Contract No. 925-44, 23 May 1944; Approximate Cost per Unit, $525.00.

TUBE COMPLEMENT:

1 JAN-3DP1, 1 JAN-2X2, 7 JAN-6SN7GT, 1 JAN-6AG7, 1 JAN-5Y3GT.

REFERENCE DATA AND LITERATURE:

TO 08-35TS100-2 (Maintenance Instructions).

TO 16-55-94 (Spare Parts List).

TEST OSCILLOSCOPE TS-100/AP
(OSCILLOSCOPE TS-100/AP)

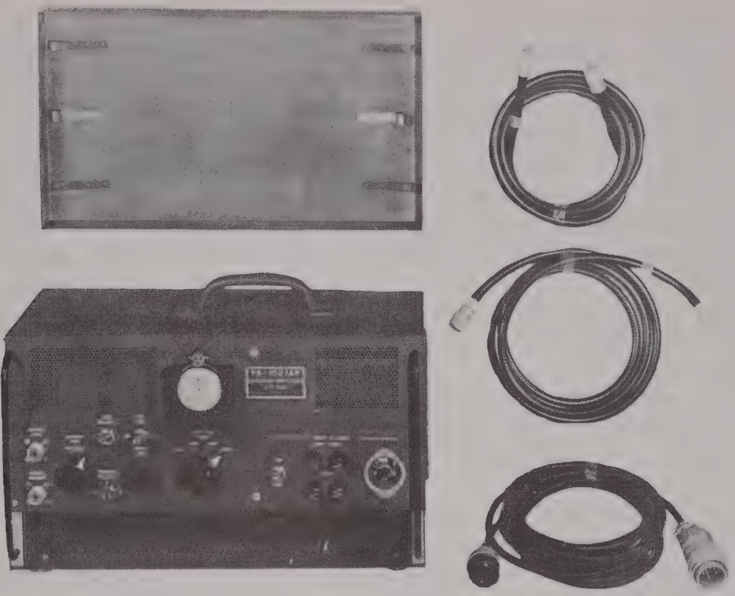
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Test Oscilloscope, TS-100/AP (Shelf Package - Water Resistant Carton)	2.44	12	16	22	50

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Test Oscilloscope (with cover) TS-100/AP		7CAC-612150 R16-AN-TS-100/AP 3FK3660-100	7-4/5	12	16	39.000
1	Cord CG-128/AP		7CAC-170270-1396 R16-AN-CG-128/AP 1F430-128	12 long			0.125
2	Cord CG-129/AP		7CAC-170270-1397 R16-AN-CG-129/AP 1F430-129	36 long			0.20
1	Cord CG-130/AP		7CAC-170270-1395 R16-AN-CG-130/AP 1F430-130	36 long			0.20
2	Cord CX-242/AP		7CAC-170265-323 R16-AN-CX-242/AP 3E6000-242	36 long	1/4 dia.		0.20
1	Cord CX-237/U		1800-322850047 R16-AN-CX-237/U 3E-6000-237	120 long			1.0
1	Instruction Book AN-16-35TS100-2		6D9810-100				
1	Fuse FU-38		8800-359000 3Z1937-37				
1	Wrench, Hex L-shape		7900-859490 6R57406-6				

RANGE CALIBRATOR TS-102/AP
(GENERATOR, PULSE, TS-102/AP)



FUNCTIONAL DESCRIPTION:

A portable precision pulse generator for producing a marker pulse and a synchronizing pulse for test purposes. These pulses calibrate the range on the screen of radio and radar sets. Two pulses are available from the "Output Sync" and the "Output Marker" terminals located on the front panel. The synchronizing pulses are controlled by the "Repetition Frequency", "Sync Polarity" and the "Sync Term" knobs which are all located on the front panel. The marker pulses are controlled by the "Marker Polarity" and "Marker Ampl Increase" knobs. The "Phase Adj" knob provides control of the phase of the marker pulse relative to the synchronizing pulse. A one-tenth second manually operated stop watch for testing range-rate calibration is also mounted on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

TS-102/AP and TS-102A/AP differ in construction of the case and by the addition of multiple output jacks on TS-102A/AP.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Limited Standard		
STOCK NOS.	7CAC-170274-24	R16-AN-TS-102/AP F16-C-14251-1003	3F4325-102
PROCUREM'T INFO.:	Signal Corps Spec. No. 271-5016, 31 March 1944		
PROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, ARL
F.I.I.N.:		FUNCTIONAL CLASS, NO.:	8.1
	- Electronics Test Equipment -		TS-102/AP

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RANGE CALIBRATOR TS-102/AP
(GENERATOR, PULSE, TS-102/AP)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Frequency stability is provided by a crystal controlled oscillator at a rate of 327,800 cycles per second. A phase shifter circuit provides two voltages 180 degrees out of phase, at the same frequency as the oscillator. The marker pulse generator squares the incoming pulse, and then differentiates the square pulse into sharp positive or negative pulses available at panel jacks. The synchronizing pulse generator produces a square-topped 50-volt pulse with a definite phase relation to the marker pulse. This phase,relationship is attained by synchronizing the multivibrator tube in the synchronizing generator with the crystal oscillator.

Power Supply: 110 to 120 volts, AC, 50 to 1200 cycles per second, single phase, 0.6 amperes approximately.

Marker Pulses:
- Basic Oscillator Frequency: 327.8 kilocycles per second.
- Pulse Repetition Rate: 327,800 pulses per second (corresponds to a radar pulse echo distance of 500 yards).
- Pulse Shape: Triangular.
- Pulse Width: 0.4 microseconds (base).
- Pulse Rise Time: 0.1 microseconds maximum.
- Pulse Amplitude: 0 to 30 volts continuously variable into high impedance.
- Pulse Polarity: Positive or negative.

Synchronizing Pulses:
- Basic Oscillator Frequency: 327.8 kilocycles per second.
- Pulse Repetition Rate: 400, 800, 1600, or 2000 pulses per second.
- Pulse Shape: Square.
- Pulse Width: 0.8 microseconds (base).
- Pulse Rise Time: 0.1 microseconds maximum.
- Pulse Amplitude: 30 to 50 volts (not adjustable) into 72 ohms.
- Pulse Polarity: Positive or negative.

Accuracy: ±20% synchronized pulse spacing, 0.1% marker pulse spacing.

Jitter Between Synchronizing and Marker Pulses: 0.02 microseconds or 10 feet maximum permissible.

Temperature Range: -40° F. to +120° F.

Type of Transmission: Pulsed Carrier.

MANUFACTURERS' OR CONTRACTORS' DATA:

Developed by Bell Telephone Laboratories, New York, New York.

Produced by Western Electric Company, New York, New York; W.E. Code No. X-66164; Contract No. 342-DAY-44; 26 April 1944; Approximate Cost perUnit, $934.19 Contract No. 12194-DAY-43; 29 June 1944; Approximate Cost per Unit, $889.80. Contract No. 1105-DAY-44; 31 May 1944; Approximate Cost per Unit, $497.70. Contract No. 2055-DAY-45-RA; 25 June 1945; Approximate Cost per Unit, $482.00.

RANGE CALIBRATOR TS-102/AP
(GENERATOR, PULSE, TS-102/AP)

TUBE COMPLEMENT:

2 JAN-6SN7GT, 5 JAN-6AC7, 2 JAN-6AG7, 1 JAN-5Y3GT.

REFERENCE DATA AND LITERATURE:

TO 16-35TS102-2 (Maintenance Instructions).
TO 16-35TS102-11 (Operating Instructions).
TO 16-35TS102-12 (Service Instructions).
TO 16-35TS102-13 (Overhaul Instructions).
TO 16-35TS102-14 (Parts Breakdown).
TO 16-55-45 (Spare Parts List).

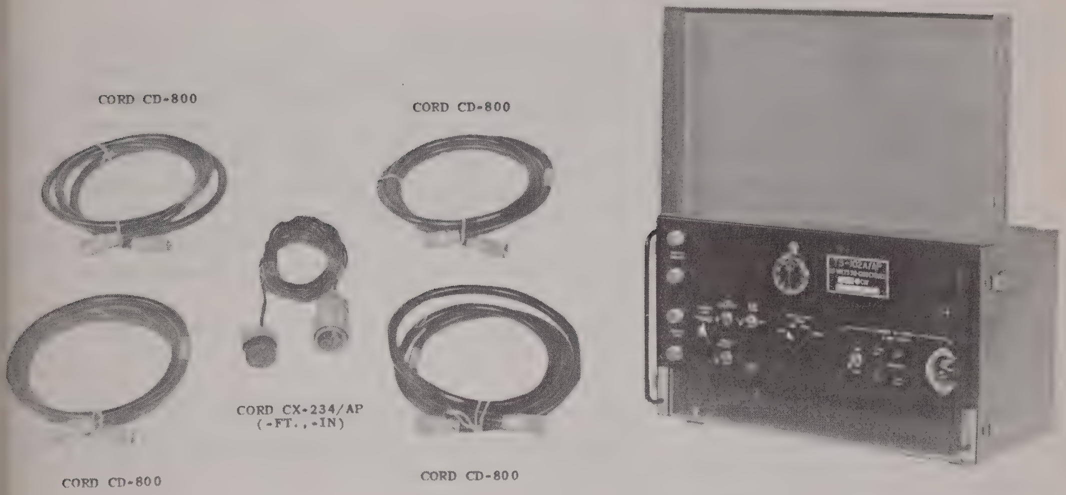
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Range Calibrator TS-102/AP with accessories (Shelf Package)	2.96	16	20	16	45

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator TS-102/AP	Metal	7CAC-170274-24 F16-C-14251-1003 R16-AN-TS-102/AP 3F4325-102	11-1/2	16-3/4	9-3/4	
1	Cord CX-154/AP		1690-322849985 3E6000-154	180 long			
2	Cord CD-800			60 long			
1	Instruction Book CO-AN-08-35TS102-2						
						Total:	38

RANGE CALIBRATOR TS-102A/AP
(CALIBRATOR, RANGE, TS-102A/AP)



FUNCTIONAL DESCRIPTION:

A portable, precision pulse generator for producing a marker pulse and a synchronizing pulse for test purposes. These pulses calibrate the range on the screen of radio and radar sets. Two pulses are available from the "Output Sync" and "Output Marker" terminals located on the front panel. The synchronizing pulses are controlled by the "Repetition Frequency", "Sync Polarity" and "Sync Term" knobs. The marker pulses are controlled by the "Marker Polarity" and the "Marker Ampl Increase" dials. The "Phase Adj" dial provides control over the phase of the marker pulse relative to the synchronizing pulse. All control knobs, dials and switches are located on the front panel. A one-tenth second manually operated stop watch for testing range-rate calibration is also mounted on the front panel.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-170276-245	R16-AN-TS-102A/AP F16-C-14251-1002	3F4325-102A
PROCUREM'T INFO.:	Navy Spec. No. RE 13A 918		
PROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, ARL
F.I.I.N.:		FUNCTIONAL CLASS, NO.:	8.1
	- Electronics Test Equipment -		TS-102A/AP

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RANGE CALIBRATOR TS-102A/AP
(CALIBRATOR, RANGE, TS-102A/AP)

RELATIONSHIP TO OTHER EQUIPMENT:

TS-102/AP and TS-102A/AP differ in construction of the case and by the addition of multiple output jacks on TS-102A/AP.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: Frequency stability is provided by a crystal controlled oscillator at a rate of 327,800 cycles per second. A phase shifter circuit provides two voltages 180 degrees out of phase and at the same frequency as the oscillator. The marker pulse generator squares the incoming pulse and then differentiates the square pulse into sharp positive or negative pulses available at the panel jacks. The synchronizing pulse generator produces a square-topped 50-volt pulse with a definite phase relation to the marker pulse. This phase relationship is attained by synchronizing the multivibrator tube in the synchronizing generator with the crystal oscillator.

Power Supply: 110 to 120 volts, AC, 50 to 1200 cycles per second, single phase, 0.6 amperes approximately.

Marker Pulses:
- Basic Oscillator Frequency: 327.8 kilocycles per second.
- Pulse Repetition Rate: 327,800 pulses per second (corresponds to a radar pulse-echo distance of 500 yards).
- Pulse Shape: Triangular.
- Pulse Width: 0.4 microseconds (base).
- Pulse Rise Time: 0.1 microsecond maximum.
- Pulse Amplitude: 0 to 30 volts continuously variable into high impedance.
- Pulse Polarity: Positive or negative.

Synchronizing Pulses:
- Basic Oscillator Frequency: 327.8 kilocycles per second.
- Pulse Repetition Rate: 400, 800, 1600 or 2000 pulses per second.
- Pulse Shape: Square.
- Pulse Width: 0.8 microsecond (base).
- Pulse Rise Time: 0.1 microsecond maximum.
- Pulse Amplitude: 30 to 50 volts (not adjustable) into 72 ohms.
- Pulse Polarity: Positive or negative.

Accuracy: ±20% synchronized pulse spacing, ±0.1% marker pulse spacing.

Jitter Between Synchronizing and Marker Pulses: 0.02 microsecond or 10 feet maximum permissible.

Temperature Range: -40° F. to +120° F.

Type of Transmission: Pulses.

MANUFACTURERS' OR CONTRACTORS' DATA:

Western Electric Company, 195 Broadway, New York 7, New York; Code X-66164B. Order No. 342-DAY-45, 31 December 1942; Approximate Cost per Unit, $934.19; Order No. 1105-DAY-44, 31 May 1944; Approximate Cost per Unit, $497.70.

RANGE CALIBRATOR TS-102A/AP
(CALIBRATOR, RANGE, TS-102A/AP)

TUBE COMPLEMENT:

5 JAN-6AC7, 2 JAN-6AG7, 2 JAN-6SN7GT, 1 JAN-5Y3GT/G.

REFERENCE DATA AND LITERATURE:

TO 16-35TS102-2	(Maintenance Instructions).
TO 16-35TS102-11	(Operating Instructions).
TO 16-35TS102-12	(Service Instructions).
TO 16-35TS102-13	(Overhaul Instructions).
TO 16-35TS102-14	(Parts Breakdown).
TO 16-55-45	(Spare Parts List).

SHIPPING DATA:

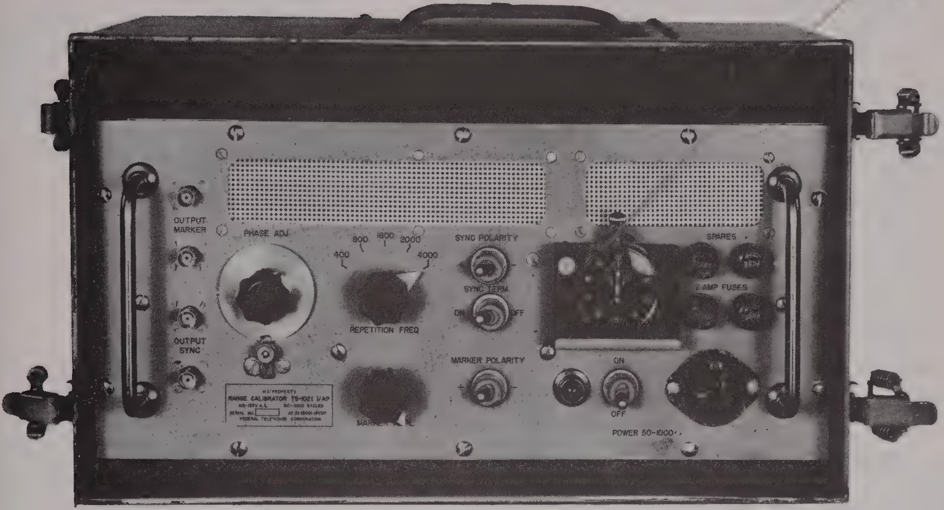
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Range Calibrator TS-102A/AP with accessories (Shelf Package - Water Resistant)	3.65	14	25	18	37

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator TS-102A/AP	Aluminum	7CAC-170276-245 R16-AN-TS-102A/AP F16-C-12451-1002 3F4325-102A	11	17-7/8	9-7/8	31
1	Cord CG-107/U		7CAC-170264-48 3E6000-234	180 long			
1	Cord CG-107/U (CD-800)		1600-154431200 1F430-107.60	60 long			

RANGE CALIBRATOR TS-102B/AP

10



FUNCTIONAL DESCRIPTION:

A portable precision pulse generator for producing a marker pulse and a synchronizing pulse for test purposes. The synchronizing pulse is used to synchronize the range calibrator with the radar set under test. By viewing the marker pulse on the range indicator of the radar set, the correct value of the indications may be determined. A one-tenth second manually operated stop watch for testing range-rate calibration is mounted on the front panel.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to TS-102A/AP except for circuitry changes and appearance. Similar to TS-706/UP Range Calibrator except that the TS-102B/AP does not include a stop watch.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The range calibrator consists of four major circuits: a high frequency supply which generates and shapes the basic signal voltage for the

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-170276-249	R16-AN-TS-102B/AP	3F4325-102B
PROCUREM'T INFO.: USAF Spec. MIL-R-4337			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, ARL	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
- Electronics Test Equipment -			TS-102B/AP

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RANGE CALIBRATOR TS-102B/AP

ELECTROMECHANICAL DESCRIPTION: (Continued)

marker pulse generator and sync pulse generator; a marker pulse generator which forms the signal voltage from the high frequency supply into marker pulses; a sync pulse generator which converts the signal received from the high frequency generator into pulses suitable for the synchronizing of a radar set; and a power supply which furnishes the high voltage DC plate supply, and low voltage AC supply for the heater and pilot light circuits. The frequency stability of the entire range calibrator is dependent upon a crystal controlled oscillator in the high frequency supply.

Power Supply: 115 volts, ±10%, AC, 50 to 1000 cycles per second, single-phase, 70 volt-amperes.

Marker Pulses:

Basic Oscillator Frequency: 327.820 kilocycles per second.

Pulse Repetition Rate: 327.820 pulses per second (corresponds to a radar pulse-echo distance of 500 yards).

Pulse Shape: Triangular.

Pulse Width at 50% Amplitude: 0.225 to 0.3 microsecond, 5000 yards marker; 0.25 to 0.35 microsecond, 500 yards marker.

Pulse Rise Time: 0.1 microsecond maximum (20% to 80% amplitude).

Pulse Amplitude: 0 to 21 volts continuously adjustable for 500 yards marker pulses.
0 to 40 volts for every 10th marker pulse or 5000 yards.

Pulse Polarity: Positive or negative.

Output Impedance: 50 ohms.

Synchronizing Pulses:

Basic Oscillator Frequency: 327.820 kilocycles per second.

Pulse Repetition Rate: 400, 800, 1600 or 2000, 4000 pulses per second.

Pulse Shape: Square.

Pulse Width at 50% Amplitude: 0.4 to 0.6 microsecond.

Pulse Rise Time: 0.1 microsecond maximum (10% to 90% amplitude).

Pulse Amplitude: 42.5 to 52.5 volts.

Pulse Polarity: Positive or negative.

Output Impedance: 75 ohms.

Accuracy: ±10% synchronized pulse spacing, ±0.1% marker pulse spacing.

Jitter Between Synchronizing and Marker Pulses: 0.02 microsecond or 10 feet maximum permissible.

Temperature Range: -40° C. (-40° F.) to $+49^{\circ}$ C. ($+120^{\circ}$ F.).

Type of Transmission: Pulses.

MANUFACTURERS' OR CONTRACTORS' DATA:

Federal Television Corporation, 139 Duane Street, New York, New York; Contract No. AF 33(600)19230, dated 30 June 1953; Approximate Cost per Unit, $287.00.

RANGE CALIBRATOR TS-102B/AP

TUBE COMPLEMENT:

6 JAN-5814/12AU7, 3 JAN-6AG7, 2 JAN-6X4W.

REFERENCE DATA AND LITERATURE:

TO 33A1-10-14-1 (Operating Instructions).
TO 33A1-10-14-2 (Service Instructions).
TO 33A1-10-14-4 (Parts Breakdown).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Range Calibrator TS-102B/AP with accessories (Shelf Package Water Resistant)	3.65	14	25	18	37

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator TS-102B/AP	Aluminum	7CAC-170276-249 R16-AN-TS-102B/AP 3F4325-102B	11	17-7/8	9-7/8	31
1	Cord CX-234/AP			180 long			
1	Cord CX-337/U			72 long			
4	Cord CG-409A/U						
2	Adapter UG-273/U						
2	Spare Lamp						

RANGE CALIBRATOR TS-126/AP
(CALIBRATOR, RANGE, TS-126/AP)

FUNCTIONAL DESCRIPTION:

A portable instrument containing a synchroscope and a pulse generator designed to facilitate the testing, maintenance and adjustment of certain airborne, range-finding and gun-sighting radar systems in the field. It is intended for ground use only.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The range calibrator contains a cathode-ray tube with high speed horizontal sweep of the start-stop variety. A negative trigger starts each individual sweep cycle, and the spot is swept across the screen in a very small fraction of the total time between trigger repetitions. The spot is normally blanked out after passing across the screen so that no return trace is visible.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-170276-26	R16-AN-TS-126/AP	3F4325-126
PROCUREM'T INFO.:			
PROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, Arm.
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	8.1
	- Electronics Test Equipment -		TS-126/AP

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

502

RANGE CALIBRATOR TS-126/AP
(CALIBRATOR, RANGE, TS-126/AP)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Any synchronized signal may be viewed through a video amplifier or by impressing it directly on one of the vertical deflection plates of the cathode-ray tube. The unit contains a trigger generator with adjustable repetition rate which may be used when an external trigger is required. In addition, this set generates two kinds of simulated echo signals, i. e.: Marker Pips (fixed marker delay or variable marker delay) and Tracker Pips.

Power Supply: 115 volts, ±10%, AC, 400 to 1600 cycles per second, single phase, 82 watts.

Self-Synchronous Trigger Pulses:
- Pulse Amplitude: 100 volts ±10%.
- Pulse Duration: Falls to 20% of full amplitude in 1.0 microsecond (160 yards).
- Pulse Repetition Rate: 950 to 1450 pulses per second.
- Pulse Polarity: Negative.
- Pulse Rise Time: Attains full amplitude in 0.18 microsecond (30 yards).
- Output Impedance: 4000 ohms paralleled by 250 micromicrofarads.

Tracker Pips:
- Pulse Amplitude: 0 to 10 volts.
- Pulse Polarity: Positive.
- Range: Variable out to 8000 yards approximately.
- Output Impedance: 1000 ohms ±20% (Resistive).

Marker Pips:
- Pulse Amplitude: 0 to 15 volts.
- Pulse Polarity: Positive.
- Pulse Spacing: 400 (±1.3) yards (except between first and second pulses).
- Output Impedance: 1000 ohms ±20% (Resistive).

Pulse Spacing Between Rises of Trigger Pulse and Second Marker Pulse:
- Fixed Marker Delay: 550 yards delay.
- Variable Marker Delay: 550 to 850 yards delay.

External Trigger Pulse:
- Pulse Amplitude: 100 volts ±20%.
- Pulse Repetition Rate: 950 to 1650 pulses per second.

Vertical Plate Deflection Sensitivity: (Connections to "Vertical Plate" jacks).
- High: 4000 volts per inch ±20% (no return trace blanking provided).
- Medium: 1000 volts per inch ±20% (optional return trace blanking).
- Low: 200 volts per inch ±20% (optional return trace blanking).

Vertical Amplifier Deflection Sensitivities: (Connections to "Vertical Amplitude" jacks).

"Vertical Gain" Switch Position:	Sensitivity:
1	370 volts per inch ±20%
2	100 volts per inch ±20%
3	30 volts per inch ±20%
4	15 volts per inch ±20%
5	8 volts per inch ±20%

(Continued)

RANGE CALIBRATOR TS-126/AP
(CALIBRATOR, RANGE, TS-126/AP)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Sweep Voltages:
4000 yard setting: 4500 yards across screen.
20,000 yard setting: 21,000 yards across screen.
Ambient Temperature Limits: -55° C. to +50° C.
Maximum Relative Humidity: 95%.

MANUFACTURERS' OR CONTRACTORS' DATA:

Galvin Manufacturing Company, 4545 West Augusta Boulevard, Chicago, Illinois; Order No. 2506-ARL-44; Order No. 1160-DAY-44; Approximate Cost per Unit, $347.28.

TUBE COMPLEMENT:

5 JAN-6SN7GT, 1 JAN-6SL7GT, 2 JAN-6AC7, 1 JAN-5Y3GT/G, 1 JAN-2X2/879, 1 JAN-2AP1.

REFERENCE DATA AND LITERATURE:

TO 16-35TS126-2 (Maintenance Instructions).
TO 16-55-104 (Spare Parts List).

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Over-all Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Range Calibrator TS-126/AP with accessories (Packed in a V-board Carton)	2.15	22	13	13	45

RANGE CALIBRATOR TS-126/AP
(CALIBRATOR, RANGE, TS-126/AP)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Over-all Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator TS-126/AP less accessories		7CAC-170276-26 R16-AN-TS-126/AP 3F4325-126	14-3/16	10-1/2	10-3/16	31.5
1	L. V. Test Lead (Red)		7CAC-468919-57 R17-L-8232 3E4300-40	38-1/2 long			0.062
1	L. V. Test Lead (Black)		7CAC-468919-58 R17-L-8232 3E4300-42	38-1/2 long			0.063
1	H. V. Test Lead		7CAC-468919-6 3E4300-41	38-1/2 long			1.625
1	Cord CG-243/AP		7CAC-170265-32 R16-AN-CG-243/AP 1F430-243.108	108 long			4.5
1	Cord CG-243/AP		7CAC-170270-1385 R16-AN-CG-243/AP 1F430-243.36	36 long			2.0
1	Instruction Book		6D9810-126				
						Total:	39.750

CALIBRATOR TS-142/APG
(CALIBRATOR, RANGE, TS-142/APG)

FUNCTIONAL DESCRIPTION:

A portable test equipment used to calibrate and adjust the velocity measuring circuits, automatic range-tracking circuits and the associated meters employed in radar equipments such as AN/APG-1, AN/APG-2, etc. The calibrator supplies an artificial video target pulse which can be made to move over a wide range of relative distances at a wide range of relative velocities with respect to an external input synchronizing pulse. All knobs for operation of the unit are located on the top panel and are labeled as to junction.

RELATIONSHIP TO OTHER EQUIPMENT:

Functionally interchangeable with TS-142A/APG. TS-142A/APG has improved stability.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Sub-Standard		
STOCK NOS.	7CAC-170276-1675		3F4325-142
PROCUREM'T INFO.:	USAF Spec. 71-5062		
PROCUREM'T COG.:	USAF	DESIGN COG.:	USAF, Arm.
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	8.1
	- Electronics Test Equipment -		TS-142/APG

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

CALIBRATOR TS-142/APG
(CALIBRATOR, RANGE, TS-142/APG)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A positive synchronizing pulse from the radar set causes the gate tube plate current to shut off and starts the cycle of events. The circuit is composed of a gate tube, trigger, fast and slow sweep generators, phase inverter, cathode follower, pulser and clipper. Time delay between input synchronizer pulse and outgoing signal may be varied by turning the "Initial Range" control which changes the grid voltage of the trigger tube, or by varying the cathode voltage of the trigger. The latter voltage is controlled by the cathode follower to introduce target motion. The phase inverter is used to obtain velocities in the minus direction.

Power Supply: 115 volts, ±10%, AC, single phase, 400 to 2400 cycles per second.
Frequency Range: 40 to 2500 pulses per second.
Type of Input and Output: Positive voltage pulses.
Input Synchronizing Pulse:
- Pulse Amplitude: 7 to 50 volts.
- Pulse Polarity: Positive.
- Pulse Width: 0.5 to 2.5 microseconds.
- Pulse Repetition Rate: 40 to 2500 pulses per second, 40 to 6000 pulses per second at the ±100 position of the "Relative Velocity Miles Per Hour."

Output Signal:
- Pulse Amplitude: 0 to 50.
- Pulse Polarity: Positive.
- Pulse Width: 0.5 to 0.75 microseconds.

Accuracy: ±10% of indicated velocity.
Temperature Range: -40 degrees C. to +50 degrees C.
Relative Humidity: 0 to 95%.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Electric Company, Electronics Park, Syracuse, New York; Order No. 684-DAY-44.

Western Electric Company, 120 Broadway, New York, New York; Order No. 11766-WF-43.

Electronics Associates Inc., 61 Brighton Avenue, Long Branch, New Jersey; Order No. 33(038)48-1183-AP, 24 December 1947; Approximate Cost per Unit, $784.00.

TUBE COMPLEMENT:

4 JAN-6SN7GT, 1 JAN-5U4G, 1 JAN-OC3/VR-105, 2 JAN-6SJ7GT, 1 JAN-6V6.

REFERENCE DATA AND LITERATURE:

TO 16-35TS142-2 (Maintenance Instructions).
TO 16-55-102 (Spare Parts List).

CALIBRATOR TS-142/APG
(CALIBRATOR, RANGE, TS-142/APG)

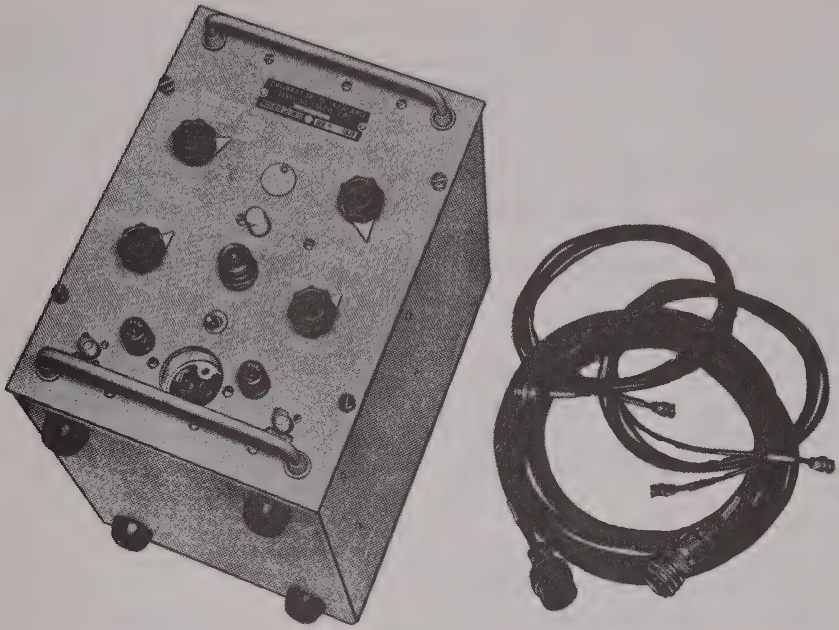
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Calibrator TS-142/APG (Shelf Package - Water Resistant Carton)	4.63	20	20	20	52

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Calibrator TS-142/APG Including:	Metal	7CAC-170276-1675 3F4325-142	8-1/2	11-1/2	11-13/16	18
2	Cable Assembly CG-409A/U			300 long			2
1	Cord (AC power) CX-241/APG		1700-322850050 3E6000-240	300 long			1.5
1	Canvas Carrying Case CY-273/APG		3F2529-273	10-3/4	11-3/4	12-3/4	3.5
1	Transit Case CY-218/APG	Wood	7CAC-176555-28 3F2623-218	14-1/2	13	15-1/2	15
						Total:	40.00

CALIBRATOR TS-142A/APG
(CALIBRATOR, RANGE, TS-142A/APG)



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument for calibration and adjustment on the ground of velocity measuring circuits and meters, and for testing of automatic range-tracking circuits of radar equipments. The calibrator supplies an artificial video target pulse which can be made to move over a wide range of relative distances at a wide range of relative velocities with respect to an external input pulse.

RELATIONSHIP TO OTHER EQUIPMENT:

This equipment is functionally interchangeable with TS-142/APG, but has improved stability.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A positive pulse from the radar set causes the gate tube plate current to shut off and starts the functioning of the range calibrator. The radar pulse causes the calibrator to set up a synchronizing pulse, which always has a

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-170276-1674		3F4325-142A
PROCUREM'T INFO.: USAF Spec. No. 71-5062			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, Arm.	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
	- Electronics Test Equipment -		TS-142A/APG

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

CALIBRATOR TS-142A/APG
(CALIBRATOR, RANGE, TS-142A/APG)

ELECTROMECHANICAL DESCRIPTION: (Continued)

fixed delay with respect to the radar pulse. Time delay between synchronizing pulse and output signal may be varied by turning a target displacement control which changes the grid voltage of a trigger tube, or by varying the cathode voltage of the trigger tube. The latter voltage is controlled by a cathode follower to introduce target motion. Velocity is controlled by the setting of a rotary switch on the panel. A phase inverter is used to obtain velocities in the negative direction.

Power Supply: 115 volts, ±10%, AC, single phase, 50 to 1600 cycles per second, approximately 69 watts.

Type of Input and Output: Positive voltage pulses.

Input Synchronizing Pulse:
- Pulse Amplitude: 7 to 50 volts.
- Pulse Polarity: Positive.
- Pulse Width: 0.5 to 2.5 microseconds.
- Pulse Repetition Rate: 400 to 2500 pulses per second, 40 to 6000 pulses per second at the ±100 position of the "Relative Velocity Miles Per Hour."
- Source Impedance: Less than 100 ohms.

Output Signal:
- Pulse Amplitude: 0 to 50 volts.
- Pulse Polarity: Positive.
- Pulse Width: 0.5 to 0.75 microseconds.
- Output Impedance: Less than 500 ohms.
- Rise Time: Less than 0.15 microseconds from 10 to 90 percent of maximum pulse amplitude.
- Delay Time: Less than 0.2 microseconds from 80 to 25 percent of maximum pulse amplitude.

Indicated Relative Velocity: -500, -100, +100, +500 miles per hour.

Accuracy: ±10% of indicated velocity.

Temperature Range: -55° C. to $+55^{\circ}$ C. (Operational).

Humidity Range: Up to 100% at $+50^{\circ}$ C.

Altitude Range: Up to 10,000 feet, operational; Air transportable up to 50,000 feet.

MANUFACTURERS' OR CONTRACTORS' DATA:

Eltronics Associates Inc., 61 Brighton Avenue, Long Branch, New Jersey; USAF Order No. 33(038)48-1183-AP, dated 24 December 1947; Approximate Cost per Unit, $790.00.

General Electric Company, Schenectady, New York; USAF Order No.684-DAY-44; Approximate Cost per Unit, $785.00.

TUBE COMPLEMENT:

4 JAN-6SN7, 1 JAN-5U4G, 1 JAN-6V6, 2 JAN-6SJ7, 1 JAN-6AG7, 1 JAN-OC3/VR-105.

REFERENCE DATA AND LITERATURE:

AN 16-35TS142-2 (Maintenance Instructions).

CALIBRATOR TS-142A/APG
(CALIBRATOR, RANGE, TS-142A/APG)

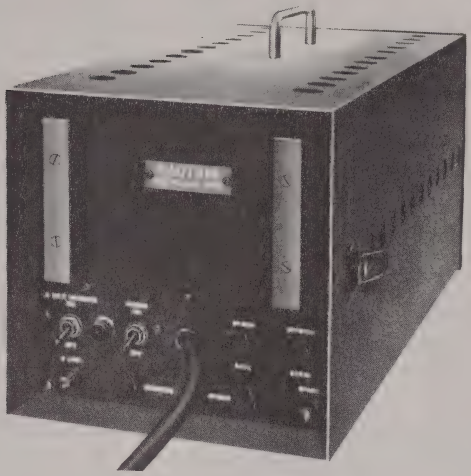
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Calibrator TS-142A/APG (Domestic Packed - Water Resistant Carton)	3.15	20	16	17	53

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Calibrator TS-142A/APG	Aluminum	7CAC-170276-1674 3F4325-142A	11	8	10-1/4	18.0
2	Cord CG-409A/U		8860-312000-211 1F425-58A	180 long			1.0
3	Adapter UG-273/U		8850-102000 2Z308-273				
1	Case CY-608/APG	Aluminum	7CSZ-SK142A-APG 2Z1800.95	17-1/32	10-3/4	13-3/4	15.0
1	Power Cable Assembly CX-1083/U		8800-257400	300 long			1.5

RANGE CALIBRATOR TS-293/CPA-5
(CALIBRATOR, RANGE, TS-293/CPA-5)



FUNCTIONAL DESCRIPTION:

A small, easily portable instrument used to calibrate and adjust the range measuring circuits of radar apparatus. All controls and jacks required for operation are located on the operating panel and are clearly marked.

The various pulses are indicated and selected by switches. The marker pulses appear on the radar receiver-indicator and adjustments are made according to the indication.

RELATIONSHIP TO OTHER EQUIPMENT:

Equipment required but not supplied: Two Cords, CD-1101.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: A crystal oscillator generates the basic signal. From the oscillator, the signal passes through a square wave generator, resistance capacitance differentiating network to a clipper and cathode follower circuit in the

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-170276-165	F16-C-74251-1614	3F4325-293
PROCUREM'T INFO.:			
PROCUREM'T COG.: USAF		DESIGN COG.: USAF, Rome	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
	- Electronics Test Equipment -		TS-293/CPA-5

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A.

RANGE CALIBRATOR TS-293/CPA-5
(CALIBRATOR, RANGE, TS-293/CPA-5)

ELECTROMECHANICAL DESCRIPTION: (Continued)

half-mile marker channel. From the clipper, the signal is fed into both the mixer tubes, through a clipper amplifier and a resistance capacitance differentiating network to the division multivibrator tubes. The multivibrator output passes through an inverter amplifier, a resistance capacitance differentiating network to the clipper circuit in the five-mile marker channel, also; through a resistance capacitance differentiating network, a synchronizing pedestal amplifier, pedestal clamper, to the pulse selector tube in the synchronizing channel. The outputs of both the clipper circuit in the five-mile marker channel and the pulse selector tube in the synchronizing channel feed into the mixer tubes. The mixer tube outputs are taken off the marker jacks. The output from the pulse selector tube in the synchronizing channel can also be taken off the synchronizing jack.

Power Supply: 115 volts, AC, 60 cycles per second, 40 watts approximately.

Output Voltages:

Marker Jacks: a) Positive pulses at intervals corresponding to half-mile radar indication. Every tenth pulse is approximately twice normal amplitude.

b) Positive pulses at intervals corresponding to five-mile radar indications.

Synchronizing Jack: 20 to 30 volt negative pulses at pulse repetition rate of 120 pulses per second. These pulses are used to synchronize the radar apparatus.

Synchronization Pulses:

Pulse Repetition Rate: 120 to 300 pulses per second.
Pulse Length: 2 microseconds.
Pulse Amplitude: 20 to 30 volts.
Output Impedance: 400 ohms.

Marker Pulses:

Spacing: 0.5 or 5 miles or both.
Amplitude: 0.5 to 10 volts.
Pulse Length: 1.2 microseconds.
Pulse Rise Time: 0.3 microseconds approximately.
Output Impedance: 400 ohms.
Crystal Frequency: 186.3 kilocycles.

MANUFACTURERS' OR CONTRACTORS' DATA:

Belmont Radio Company, Division Raytheon Manufacturing Company, 5921 West Dickens Avenue, Chicago 39, Illinois; Order No. 3660-CE-GSA-44; Order No. 44-923, 26 January 1945; Approximate Cost per Unit, $267.09.

TUBE COMPLEMENT:

7 JAN-6SN7GT, 2 JAN-6L6GA, 1 JAN-6SA7, 1 JAN-5Y3GT.

REFERENCE DATA AND LITERATURE:

TO 16-35TS293-2 (Maintenance Instructions).
TO 16-55-335.

RANGE CALIBRATOR TS-293/CPA-5
(CALIBRATOR, RANGE, TS-293/CPA-5)

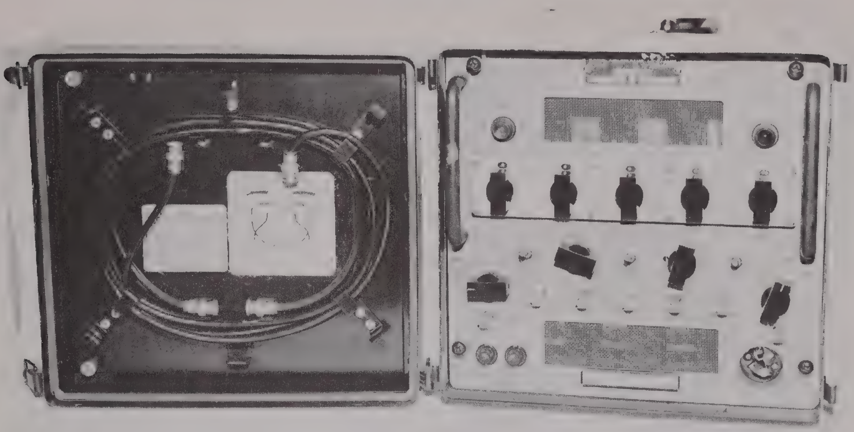
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Range Calibrator TS-293/CPA-5 (Shelf Package - Water Resistant Carton)	4.83	18	16	29	74

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator TS-293/CPA-5	Metal	7CAC-170276-165 F16-C-74251-1614 3F4325-293	9-3/4	9	20-1/4	49

RANGE CALIBRATOR TS-573/UP



FUNCTIONAL DESCRIPTION:

A portable general purpose precision range calibrator test set that provides a strobe output to calibrate the range circuits of pulse type radar equipments. The test set may also be used to determine the range of an external marker by comparing the marker input with the strobe. This can be done either by an internal comparator circuit or by an external test scope.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The equipment utilizes a precision crystal controlled oscillator to generate a standard signal equivalent to a range of 25 yards per cycle. This signal is fed, by means of a gated amplifier, to a counting network which produces 100-yard output pulses. The equipment is preset to a selected range by an adjustable counting network, and when coincidence of the counting network occurs, the coincidence circuit triggers the output blocking oscillator through a time delay network. The resultant output is the strobe at the desired range.

A dither compensator circuit automatically injects a bias voltage to adjust the timing of the strobe output so that jitter of the output strobe is eliminated. The comparator circuit utilizes a pentode mixer biased beyond cut off.

Power Supply: 115 volts ±10%, AC, 50 to 1000 cycles per second, single-phase; 110 watts. A panel switch permits choice of operation on 105, 110, 115, 120, or

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.	Standard		
STOCK NOS.	7CAC-170276-35	F16-Q-304724-200	3F2445-573

PROCUREM'T INFO.: Spec. MIL-C-15539(Ships) & Am. 1 dtd 15 Dec 1950

PROCUREM'T COG.: USN — DESIGN COG.: USN, BuShips

F.I.I.N.: — FUNCTIONAL CLASS. NO.: 8.1

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RANGE CALIBRATOR TS-573/UP

ELECTROMECHANICAL DESCRIPTION: (Continued)

125 volts from the AC line.

Crystal Oscillator Frequency: 6.55598 megacycles per second, corresponding to 25-yard intervals.

Internal Trigger Pulse Repetition Rate: 160, 480, 800, 1200, and 2400 pulses per second.

Strobe Output: 10-yard steps between 100 to 399,990 yards plus inherent "zero error" either positive or negative polarity, and a minimum amplitude of 0.5 volt when amplitude is at maximum gain.

Accuracy (Range Indications): ±0.01% ±10 yards.

The set is capable of calibrating radar sets having any of the following characteristics:

Repetition Rate: 47 to 5,000 pulses per second with up to ±10% jitter.

Pulse Width: 0.12 to 6 microseconds of 10 volts amplitude.

Range Presentations: Sweeps from 1000 to 400,000 yards.

Tracking: Automatic or manual.

MANUFACTURERS' OR CONTRACTORS' DATA:

Radio Corporation of America, RCA Victor Division, Camden, New Jersey; Contract No. NObsr-52327, dated 17 September 1952.

TUBE COMPLEMENT:

24 JAN-6BF7, 4 JAN-5784, 6 JAN-5840, 1 JAN-5902, 43 Crystal Diodes type G5S3.

REFERENCE DATA AND LITERATURE:

NAVSHIPS 91760 (Instruction Book).

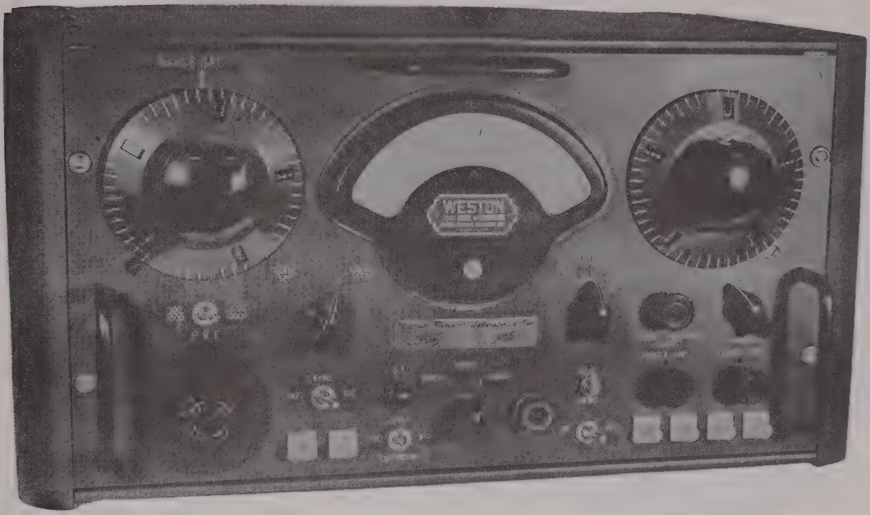
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator TS-573/UP		7CAC-170276-35 F16-Q-304724-200 3F2445-573	12	13	22-1/2	44

RANGE CALIBRATOR
Model 312D
(Missouri Research Laboratories)



FUNCTIONAL DESCRIPTION:

A portable general purpose test instrument used to accurately calibrate radar range and tracking circuits. The basic function is to simulate return signals from a target which is either fixed or moving with constant velocity. The radar set under test indicates the range information received from the range calibrator.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The circuitry consists of a stable pulse repetition frequency oscillator used to synchronize the trigger generating circuits, saw tooth timing circuits used to control the range, range-rate pulse forming generators, a DC amplifier, and range metering circuits. The target output pulses are range variable from 0 to 500, 5,000 or 50,000 yards and range-rate variable in either direction from 0 to 1500 knots. A meter, calibrated in yards, is used to monitor the range. This unit may also be synchronized with an external trigger from the radar system under test.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
	- Electronics Test Equipment -		Mo. Research 312D

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RANGE CALIBRATOR
Model 312D
(Missouri Research Laboratories)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: 117 volts, AC, 60 cycles per second, 2.2 amperes, single-phase.
Frequency Range: 100 to 10,000 pulses per second.
Type of Transmission: Pulses.
Output Pulses: Trigger Pulse: Variable ± 5 to 50 volts.
Target Pulse: Variable ± 0 to 50 volts.
Pulse Width: 0.5 microsecond approximately.
Output Impedance: Positive target or trigger; 100 ohms approximately.
Negative target or trigger; 200 ohms approximately.
Accuracies: Range, 0.25% of indicated value (Dial).
Range-Rate, 0.5% of indicated value (Dial).

MANUFACTURERS' OR CONTRACTORS' DATA:

Missouri Research Laboratories, Incorporated, 2109 Locust Street, St. Louis 3, Missouri.

TUBE COMPLEMENT:

7 JAN-12AT7, 6 JAN-6BQ7, 5 JAN-6AL5, 1 JAN-12AX7, 4 JAN-6AU6, 3 JAN-6AH6, 3 JAN-6SU7, 2 JAN-6Y6, 1 JAN-5V4, 1 JAN-5Y3, 1 JAN-6AG7, 1 JAN-VR105.

REFERENCE DATA AND LITERATURE:

Contractors' Data Sheet.

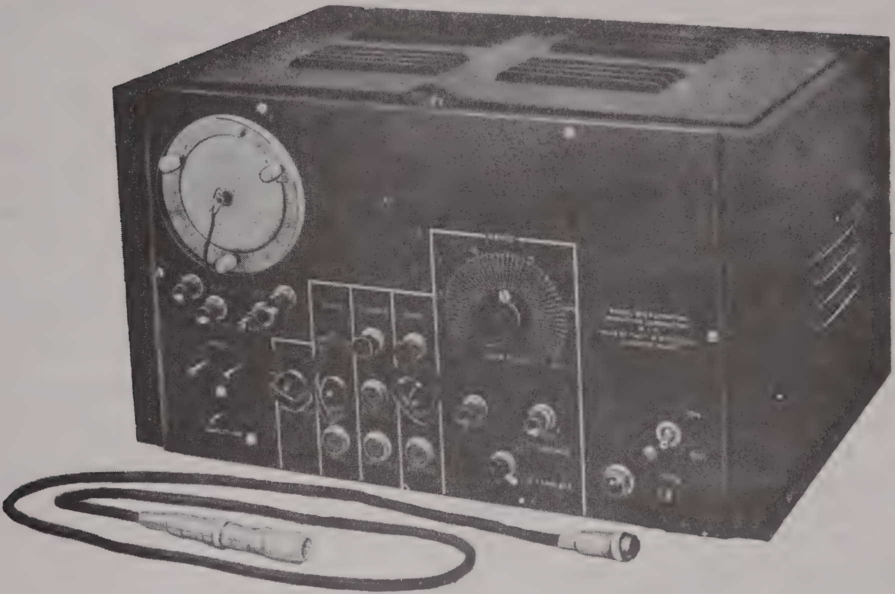
SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1 ctn.	Range Calibrator Mo. Research 312D	10	30	24	24	100

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator (Mo. Research 312D)	Aluminum		11-5/8	21-5/8	15-1/4	83

RANGE CALIBRATOR
MODEL NO. III
(F. W. Sickles Company)



FUNCTIONAL DESCRIPTION:

A portable, general purpose, self-contained test set used in calibrating and checking of radar systems and their associated equipment. There are two models of this unit: the land mile type and the 2000 yard type; the only variation is as indicated in the range. It is essentially a pulse generator synchronized with a circular sweep system of an oscillograph. Because of the type and the variety of pulses generated, the test set can be used for many purposes other than range calibration. Indications are viewed on a cathode ray tube.

RELATIONSHIP TO OTHER EQUIPMENT:

Model No. III is an improved Sickles Range Calibrator Model No. II. Used as Interim for TS-573/UP Range Calibrator.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAC-170276-1654		
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.1	
	- Electronics Test Equipment -		Sickles III

his project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U. S. A.

RANGE CALIBRATOR
MODEL NO. III
(F. W. Sickles Company)

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The range calibrator consists of a crystal-controlled oscillator, a phase-shifting network for forming a circular trace, a pulse shaper stage, and a blocking oscillator for determining the pulse repetition rate. The output of the blocking oscillator and the crystal oscillator are combined in the "coincidence" amplified to produce an accurately timed pulse at a repetition rate determined by the blocking oscillator. This pulse fires a second blocking oscillator which produces a very short pip which is used to synchronize the remainder of the circuit. The cathode follower provides both a positive and negative polarity trigger pulse which go to their respective "output" jacks. The trigger pulse also goes through a pulse sharpening peak separator stage and then to the gate delay multivibrator. The output of this stage trips the gate multivibrator, the output of which is used to intensely modulate the cathode ray tube. There is also a video amplifier for any weak incoming signals.

Power Supply: 109 to 124 volts, AC, 60 cycles per second, single phase, 110 watts.

Crystal Sweep Frequency:
- One Land Mile Model: 93.11 kilocycles per second.
- 200 Yard Model: 81.94 kilocycles per second.

Type of Transmission: Pulsed, Continuous Wave.

Range: Up to 25 miles.

Input Impedance: High.

Trigger Output Characteristics:
- Pulse Amplitude: 100 volts.
- Pulse Polarity: Positive or Negative.
- Output Impedance: 1000 ohms.
- Pulse Repetition Rate:

Switch Position 1	400 cycles per second.
Switch Position 2	800 cycles per second.
Switch Position 3	1200 cycles per second.
Switch Position 4	2000 cycles per second.
Switch Position 5	2300 cycles per second.

- Pulse Duration: 0.5 to 10 microseconds.
- Pulse Delay: Up to 300 microseconds which extends the range up to 25 miles.
- Pulse Length: Approximately 0.6 microseconds.

Gate Output:
- Pulse Amplitude: 138 volts.
- Impedance: High.

Crystal Oscillator Output:
- Frequency: 93.11 kilocycles per second or 81.94 kilocycles per second (depending on model).
- Transmission: Continuous Wave.
- Amplitude: 30 volts rms.

(Continued)

RANGE CALIBRATOR
MODEL NO. III
(F. W. Sickles Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

Video Amplifier:

Maximum Input Voltage: 2.7 volts rms.

Gain: Approximately 18.

Bandwidth: 5 megacycles per second, 6 decibels down.

Calibration: Calibrated in 1/2 mile steps for One Land Mile Model and in 1000 yard steps for 2000 Yard Model.

MANUFACTURERS' OR CONTRACTORS' DATA:

F. W. Sickles Division, General Instrument Corporation, Chicopee, Massachusetts.

TUBE COMPLEMENT:

1 JAN-3DP1, 1 JAN-2X2, 1 JAN-5V4G, 1 JAN-OC3/VR-105, 1 JAN-OD3/VR-150, 1 JAN-6SK7, 5 JAN-6SN7, 1 JAN-6AG7.

REFERENCE DATA AND LITERATURE:

AN 16-45-61 (Maintenance Instructions).

Operating Data Model III Calibrator, F. W. Sickles Company, Ernest Gostyn.

SHIPPING DATA:

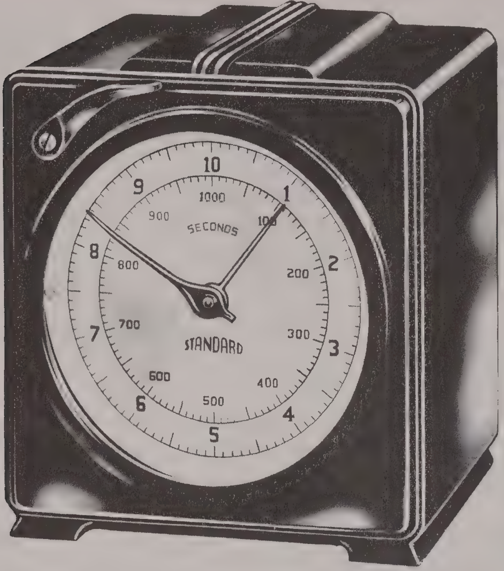
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Range Calibrator Model No. III	Metal	7CAC-170276-1654	9-3/4	17	12-1/8	44.2
2	Cable, Coaxial			60 long			

8.2 CHRONOSCOPE AND CHRONOMETERS

TIMER, PRECISION
Part No. S-10
(Standard Electric Time Company)



Note: Available in both black or satin aluminum finish dial.

FUNCTIONAL DESCRIPTION:

An accurate general purpose instrument which is used to accurately measure elapsed time. It is commonly used in connection with production work and laboratory and maintenance testing, and is supplied in either a portable or a panel-mounted type. The portable type is housed in a bakelite case and the panel-mounted type is attached to a square metal plate.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The circuit of the timer consists of an electric clutch driven by a synchronous motor. This electromechanical unit allows the hands of the timer to move when the clutch is engaged and to stop when the clutch is disengaged. The timer is operated by connecting it to a control circuit which causes

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.	7CAD-855900		
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.: Commercial	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 8.2	
	- Electronics Test Equipment -		Standard Elec. S-10

This project was supported by the USAF on Contract AF 33(600)28276 and monitored by WADC, ARDC - Carl L. Frederick, Bethesda, Md. - Multilithed in U.S.A

TIMER, PRECISION
Part No. S-10
(Standard Electric Time Company)

ELECTROMECHANICAL DESCRIPTION: (Continued)

it to function for the duration of an input impulse. A hand-operated switch is also supplied with the unit. A manual reset for returning the hands to zero is standard with an electric unit as an optional attachment. The timer is available with either a black or satin aluminum finish dial.

Power Supply: 115 volts, AC, 60 cycles per second, single-phase.
Optional Circuit: 115 volts, AC, 25 or 50 cycles per second, single-phase.
220 volts, AC, 25, 50, or 60 cycles per second, single-phase;
6, 12, 24, 48 or 120 volts, DC, for electric clutch.

Fast Hand Speed: 1 revolution in 10 seconds.

Maximum Timing Range: 1000 seconds.

Dial Calibration: 0 to 10 seconds in increments of 1/10 second.
0 to 1000 seconds in increments of 10 seconds.

Accuracy: ±0.02 second per operation.

MANUFACTURERS' OR CONTRACTORS' DATA:

Standard Electric Time Company, Springfield 2, Massachusetts.

Contract No.	Date	Approximate Cost per Unit
33(604)54779	12-10-53	(Electric Reset), $83.00.
33(604)7506	5- 2-53	(Manual Reset), $61.00.

TUBE COMPLEMENT:

None.

REFERENCE DATA AND LITERATURE:

Standard Electric Time Company Catalog #198.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	

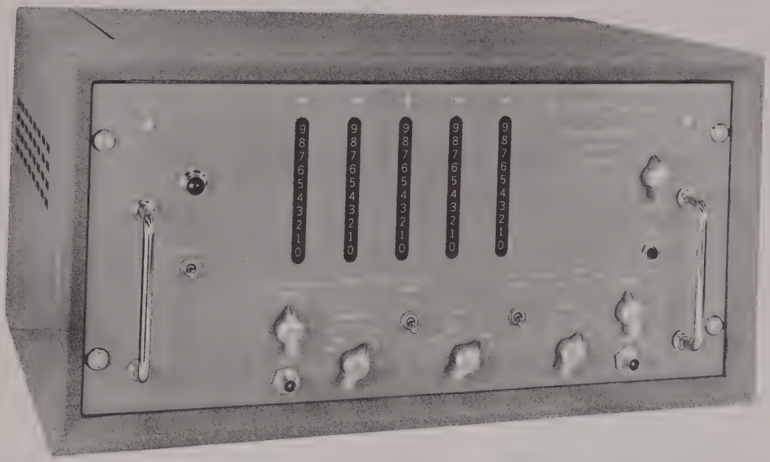
TIMER, PRECISION
Part No. S-10
(Standard Electric Time Company)

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Timer, Precision (Standard Electric Time S-10)	Bakelite on Portable Type Metal on Mounted Type	7CAD-855900	4-1/2	4-1/2	4-1/2	5

8. 3 TIME INTERVAL MEASURING EQUIPMENT

TIME-INTERVAL METER
BERKELEY MODEL 7250
(Beckman Instruments, Incorporated)



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used to measure the elapsed time between any two events of an optical, mechanical, or electrical nature which can be represented by a changing voltage. The instrument can also be used to measure the period of an applied frequency and the ratio of two different frequencies. Test results are indicated directly in digital form on a 5-place counter.

RELATIONSHIP TO OTHER EQUIPMENT:

The 7250 model supersedes Time-Interval Meter Berkeley 510.

ELECTROMECHANICAL DESCRIPTION:

Power Supply: 117 volts, AC, ±10%, 50 to 60 cycles per second, 260 watts.
Range (Time Interval or Period): 10 microseconds to 1 second.
Accuracy: ±10 microseconds, ±1 part in 10^5.
External Standard Input: 0 to 100 kilocycles per second, 3 volts rms.
Sensitivity: 0.1 volt rms.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:		DESIGN COG.:	Commercial
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	8.3
	- Electronics Test Equipment -		Berkeley 7250

TIME-INTERVAL METER
BERKELEY MODEL 7250
(Beckman Instruments, Incorporated)

ELECTROMECHANICAL DESCRIPTION: (Continued)
Input Impedance: 10 megohms, AC or DC coupled.
Trigger Slopes: Positive or negative.
Attenuation Range: 1, 10, 100 volts positive or negative.
Display Time: Adjustable 0.1 to 10.0 seconds.

MANUFACTURERS' OR CONTRACTORS' DATA:

Berkeley Division of Beckman Instruments, Incorporated, 2200 Wright Avenue, Richmond 3, California; Approximate Cost per Unit, $695.00.

TUBE COMPLEMENT:

7 5965, 4 6U8, 1 6AL5, 1 6080, 1 6350, 1 6AS6, 1 5687, 1 6AU6.

REFERENCE DATA AND LITERATURE:

Manufacturer's Catalog.

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Time-Interval Meter Berkeley 7250	aluminum		10-1/2	20-3/4	16-1/2	

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Time-Interval Meter Berkeley 7250					60

ELECTRICAL & ELECTRONIC

TEST EQUIPMENT DATA HANDBOOK

VOLUME 9

NUCLEAR ENERGY TEST AND MEASURING EQUIPMENT

9

FREDERICK RESEARCH CORPORATION
2601 UNIVERSITY BOULEVARD, WEST
WHEATON, MARYLAND

ELECTRICAL & ELECTRONIC

TEST EQUIPMENT DATA HANDBOOK

VOLUME 9

NUCLEAR ENERGY TEST AND MEASURING EQUIPMENT

9

FREDERICK RESEARCH CORPORATION
2601 UNIVERSITY BOULEVARD, WEST
WHEATON, MARYLAND

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION

9. NUCLEAR ENERGY TEST AND MEASURING EQUIPMENT

9.1 Radiac Set

9.2 Radiac Test Equipment

9.3 Dosimeter

ELECTRONICS TEST EQUIPMENT
FUNCTIONAL CLASSIFICATION - DEFINITIONS

9. NUCLEAR ENERGY TEST AND MEASURING EQUIPMENT

Equipment used to test or measure the radiation produced by radioactive materials.

9. 1 RADIAC SET

An equipment used to measure the intensity of nuclear radiations.

9. 2 RADIAC TEST EQUIPMENT

An equipment used to test radiac sets.

9. 3 DOSIMETERS

An instrument used to indicate the accumulated exposure to nuclear or X-ray radiation.

TABLE OF CONTENTS

9. NUCLEAR ENERGY TEST AND MEASURING EQUIPMENT

9.1 RADIAC SETS

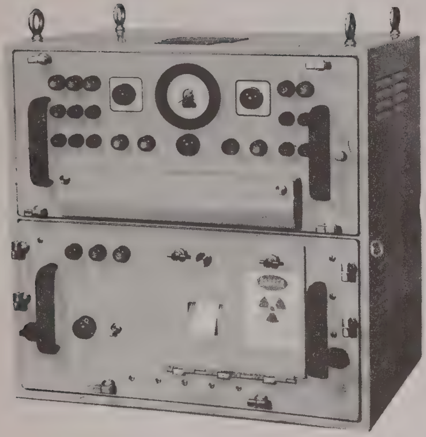
Functional Classification	Designation	Name	
9.1	AN/BDQ-1A	Radiation Monitoring Set	551
9.1	AN/BDQ-3	Radiation Monitoring Set	555
9.1	AN/PDR-10A	Radiac Set	559
9.1	AN/PDR-10C	Radiac Set	563
9.1	AN/PDR-18B	Radiac Set	567
9.1	AN/PDR-27H	Radiac Set	571
9.1	AN/PDR-45	Radiac Set	575
9.1	AN/PDR-49	Radiac Set	579

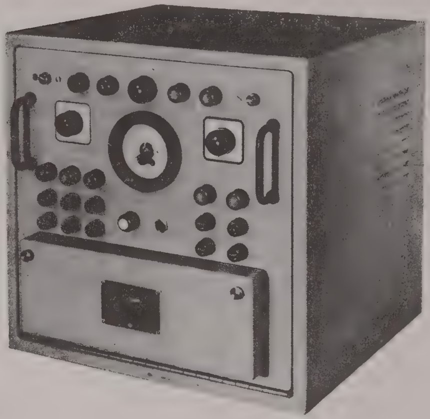
ALPHA-NUMERICAL INDEX

Designation	Name	Functional Classification
AN/BDQ-1A	Radiation Monitoring Set	9.1
AN/BDQ-3	Radiation Monitoring Set	9.1
AN/PDR-10A	Radiac Set	9.1
AN/PDR-10C	Radiac Set	9.1
AN/PDR-18B	Radiac Set	9.1
AN/PDR-27H	Radiac Set	9.1
AN/PDR-45	Radiac Set	9.1
AN/PDR-49	Radiac Set	9.1

9.1 RADIAC SETS

RADIATION MONITORING SET AN/BDQ-1A





FUNCTIONAL DESCRIPTION:

A radiation monitor designed to detect and indicate the levels of radioactivity at selected locations on a nuclear-powered vessel. The test set will measure gamma radiation, and air contamination by counting radioactive particles. Results are indicated by meters calibrated in milliroentgens per hour and microcuries per cubic centimeter.

RELATIONSHIP TO OTHER EQUIPMENT:

The AN/BDQ-1A differs from the AN/BDQ-1 in that it has a wider range of detection, incorporates a different amplifier and high voltage power supply, utilizes a different detecting element, has an increase in rate of air flow, has a continuously moving collecting tape, and incorporates different types of rectifiers in the +200 volt power supplies. The AN/BDQ-1 is similar to the AN/BDQ-1(XN-1) except that the AN/BDQ-1 does not include a thermal neutron channel for measuring thermal neutron flux.

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			

PROCUREM'T INFO.: Spec Ships-R-1921
PROCUREM'T COG.: Navy DESIGN COG.: Navy, BuShips
F. I. I. N.: FUNCTIONAL CLASS. NO.: 9.1
- Electronics Test Equipment - AN/BDQ-1A

RADIATION MONITORING SET AN/BDQ-1A

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set is comprised of two units, a computer-indicator radiac (gamma) and a computer-detector-indicator radiac (air particle). Each unit consists of a detecting element, an amplifier, a count-rate circuit, an alarm-indicating circuit, an automatic checking system and a power supply. In addition the air-particle unit includes an air-flow and tape-drive system. The detecting element in the air-particle unit is intergral with the unit. The detecting element in the gamma unit may be used either as a separate unit or intergral with the gamma computer-indicator. Signals from the detectors are amplified, standardized in amplitude, and converted to a direct current proportional to the logarithm of the count rate. This current is applied to the meter and alarm circuits of each unit. A panel lamp and buzzer are incorporated in the alarm circuit of each unit and indicate when the measured radiation exceeds a preset level. Automatic means are provided which check circuit operation of each unit at 10 minute intervals. Panel lamps provide indications of circuit malfunctions. Terminals are provided to permit connection of remote radiation alarm and circuit fault indicators.

Power Supply: 115 volts, AC, ±10%, 60 cycles per second ±5%, single-phase.

Air Particle Contamination Range: 0.5×10^{-9} to 1×10^{-6} microcuries per cubic centimeter.

Air Particle Contamination Alarm Set Levels: 3×10^{-9} to 1000×10^{-9} microcuries per cubic centimeter.

Gamma Measurement Range: 1 to 1000 milliroentgens per hour.

Gamma Alarm Set Levels: 2 to 200 milliroentgens per hour.

Operating Temperature Range: 0 to 70°C.

MANUFACTURERS' OR CONTRACTORS' DATA:

Airborne Instruments Laboratory, Incorporated, Mineola, New York; Contract No. NObsr 64824, dated 23 June 1954.

TUBE COMPLEMENT:

4 1N253, 12 1N443, 16 1N459, 8 1N590, 1 302 (modified Anton), 3 2C53, 6 5654, 6 5651WA, 6 5751, 31 6021, 4 6080 WA.

REFERENCE DATA AND LITERATURE:

NavShips 92912 (A) Technical Manual.

SHIPPING DATA:

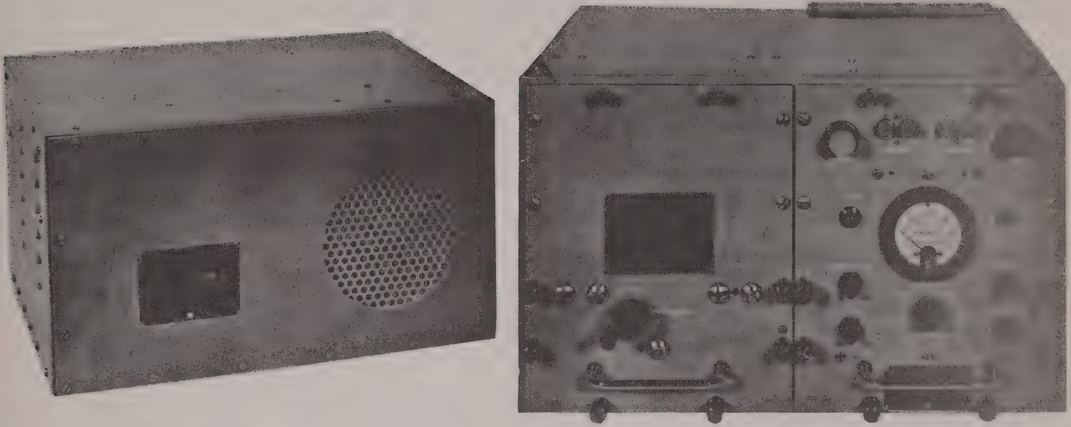
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
2	Computer-Detector-Indicator, Radiac CP-337/BDQ-1A	6.1 9.3	17 22	26 28	24 26	185 245
1	Computer-Indicator, Radiac CP-304/BDQ-1 and Detector, Radiac DT-174/BDQ-1	7.6	26	23	22	155

RADIATION MONITORING SET AN/BDQ-1A

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radiation Monitoring Set AN/BDQ-1A including:						
1	Computer-Detector-Indicator CP-337/BDQ-1A	metal		20	20	15-3/8	298
1	Computer-Indicator, Radiac CP-304/BDQ-1	metal		15	15	15-1/4	79
1	Detector, Radiac DT-174/BDQ-1	metal		3-15/32	5-1/2	8-3/8	3-1/4
1	Connector, P2501				2-5/32 x 2-1/4		
1	Cable RG-160/U			1200 long			
1	Servicing Cable for CP-304/BDQ-1						
1	Box, Spare Parts						
1	Instruction Manual NavShips 92912(A)						

RADIATION MONITORING SET AN/BDQ-3



FUNCTIONAL DESCRIPTION:

A general purpose equipment designed to detect and measure beta and gamma radiation. Test results are indicated by a meter calibrated in microcuries per cubic centimeter and by an audible alarm which is actuated when the radioactive concentration exceeds a predetermined level.

RELATIONSHIP TO OTHER EQUIPMENT:

Interconnecting and power cables and a connecting pipe to connect a vacuum pump to the radiacmeter are equipments required but not supplied.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set is comprised of a radiacmeter and a vacuum pump. Each unit is housed in a separate enclosure. The radiacmeter consists of a detector and a computer-indicator assembly. The detector assembly contains a sheilded photomultiplier tube and crystal, a solenoid-positioned SR 90 radiation test source, a filter tape and filter tape drive assembly, a tape break

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.: Spec Ships-R-2305			
PROCUREM'T COG.: Navy		DESIGN COG.:	Navy, BuShips
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 9.1	
- Electronics Test Equipment -			AN/BDQ-3

RADIATION MONITORING SET AN/BDQ-3

ELECTROMECHANICAL DESCRIPTION: (Continued)

switch and associated circuits. A crank is provided for manually advancing the paper tape. The computer-indicator contains a pulse amplifier, a pulse discriminator, a pulse shaper, a ratemeter, a high radiation level alarm, a failure alarm, gamma compensation circuits and a high voltage power supply. The vacuum pump consists of a rotary pump driven by an induction motor, differential pressure switches, and a high-pressure cutout switch.

Power Supply: 115 volts, AC, ±10%, 60 cycles per second ±5%, single-phase, 575 watts.

Radiation Measurement Range: 5×10^{-10} to 1×10^{-6} microcuries per cubic centimeter.

Alarm Set Range: 0 to 10^{-6} microcuries per cubic centimeter.

Permissible Gamma Background: 60 milliroentgens per hour.

Ambient Temperature Range: 0° to 50°C.

MANUFACTURERS' OR CONTRACTORS' DATA:

Fairchild Camera and Instrument Corporation, Syosset, New York; Contract No. NObsr 71388.

TUBE COMPLEMENT:

2 BS101, 1 BS1, 2 5886, 1 6467; 24 2N117, 2 2N118, 4 952, 3 970 (transistors); 21 1N198, 14 1N457, 2 1N540, 2 1N254, 2 1N253, 10 653C1, 5 653C4, 2 U60HFP (diode).

REFERENCE DATA AND LITERATURE:

NavShips 93136 Instruction Manual.

SHIPPING DATA:

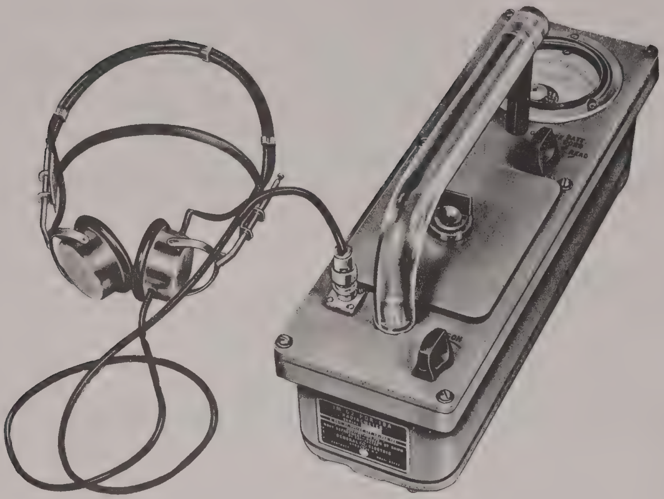
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Radiacmeter IM-137/BDQ-3	5.19	16-1/2	24	22-1/2	175
1	Vacuum Pump HD-299/BDQ-3	3.28	14	22	18-1/4	120

RADIATION MONITORING SET AN/BDQ-3

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radiation Monitoring Set AN/BDQ-3 including:						
1	Radiacmeter IM-137/BDQ-3	metal		12-1/2	20	18-1/2	152
1	Vacuum Pump HD-299/BDQ-3	metal		10	18	14-1/4	112
1	Instruction Manual Navships 93136						

RADIAC SET AN/PDR-10A



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument designed to detect the presence and measure the intensity of alpha radiations. Visual and aural indications are provided by means of an internally illuminated meter and a detachable headset.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The instrument is a self-contained, battery-operated alpha detector and indicator. A proportional counting chamber is employed, consisting basically of an air chamber which contains an anode and a cathode. The signal developed by the counting chamber is fed through a pulse amplifier and then to a pulse shaper which is a one shot multivibrator. The indicator is located in the plate circuit of the multivibrator. The power for the counting chamber is provided by a high voltage low leakage capacitor. The function

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.:	Navy	DESIGN COG.:	Navy, BuShips
F.I.I.N.:		FUNCTIONAL CLASS. NO.:	9.1
	- Electronics Test Equipment -		AN/PDR-10A

RADIAC SET AN/PDR-10A

ELECTROMECHANICAL DESCRIPTION: (Continued)

switch, when in the charge position, places a high voltage on the capacitor which will hold its charge for several hours. A discharge switch located on the front panel provides a momentary drain on the high voltage capacitor so that the counting chamber is out of corona.

Power Supply: Three 1.35 volt Batteries RG-4, four 30 volt Batteries No. 413.

Range: 0 to 10,000 disintegrations per minute per 150 square centimeter.

MANUFACTURERS' OR CONTRACTORS' DATA:

General Electric Company, Syracuse, New York; Contract No. NObsr 43442 and NObsr 49239.

TUBE COMPLEMENT:

1 CK-5785, 1 3V4, 3 *CK-527AX, 1 *CK-518AX

*contained within potted assemblies.

REFERENCE DATA AND LITERATURE:

Instruction Book for Radiac Set AN/PDR-10A NavShips 91507(A).

SHIPPING DATA:

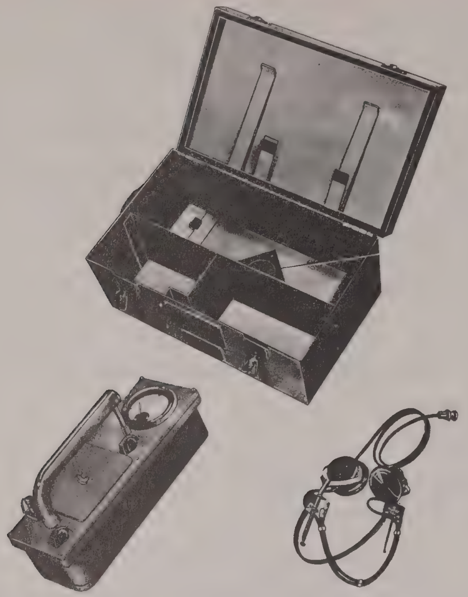
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Radiac Set AN/PDR-10A	2.0	21.5	14	11.5	29

RADIAC SET AN/PDR-10A

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radiac Set AN/PDR-10A Including:	metal					
1	Case CY-955/ PDR-10A	metal		7-5/8	10-1/2	16-5/8	7.5
1	Radiacmeter IM-62/PDR-10A			6-1/4	4-1/4	13-1/16	7.1
1	Headset H-43/U						0.75
1	Wrench						0.4
1	Equipment Spare Parts						2.0
2	Instruction Book NavShips 91507(A)						2.0

RADIAC SET AN/PDR-10C



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument designed to detect the presence and measure the intensity of low level alpha radiation. Visual and aural indications are provided by means of an internally illuminated meter and a detachable headset.

RELATIONSHIP TO OTHER EQUIPMENT:

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The instrument is a self contained, battery operated alpha detector and indicator. A proportional counting chamber is employed consisting basically of an air chamber which contains an anode and a cathode. The counting chamber has a gain of approximately one thousand. The signal developed by the counting chamber is fed to an amplifier and then to a multivibrator

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.: MIL-R-16086B			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 9.1	
	- Electronics Test Equipment -		AN/PDR-10C

ELECTROMECHANICAL DESCRIPTION: (Continued)

circuit. The indicating meter, in the plate circuit of the multivibrator, indicates the number of times per minute alpha particles enter the counting chamber. The power for the counting chamber is provided by a high-voltage low-leakage capacitor which is charged by rotating the function switch to the charge position. The discharge switch located on the front panel provides a method of decreasing the capacitor charge to the proper operating voltage level.

Power Supply: Two 1.3 volt Batteries RG-4, six 2 -1/2 volt Batteries BA-261/U.

Range: 0 to 10,000 disintegrations per minute per 150 square centimeters.

Effective Energy Range: 4 to 5 million electron volts.

Accuracy: ±10% for readings above the first 20% of full scale.

MANUFACTURERS' OR CONTRACTORS' DATA:

Victoreen Instrument Company, 5806 Hough Avenue, Cleveland 3, Ohio; Contract No. NObsr 63049.

TUBE COMPLEMENT:

1 3V4, *3 CK527, 1 *5854, 1 CK5785.

*Contained within potted assemblies.

REFERENCE DATA AND LITERATURE:

Instruction Book for Radiac Set AN/PDR-10C, NavShips 91954.

SHIPPING DATA:

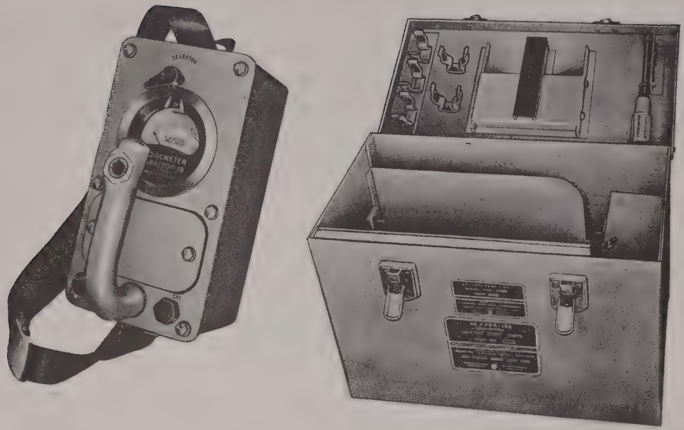
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Radiac Set and Equipment Spare Parts AN/PDR-10C	2.0	12	13	22	25

RADIAC SET AN/PDR-10C

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radiac Set AN/PDR-10C Including:	metal					
1	Case, Radiac Set CY-1162A/PDR-10B			8	10	17	14
1	Radiacmeter IM78A/PDR-10B			7	5	15	8
1	Headset, H43/U			4	7	7	1
2	Instruction Book			1/2	9	11	1

RADIAC SET AN/PDR-18B



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument designed to detect and measure high intensity gamma radiation. A meter, located on the front panel of the instrument, indicates up to 500 roentgens-per-hour on a scale color-coded corresponding to range.

RELATIONSHIP TO OTHER EQUIPMENT:

The AN/PDR-18B is similar to the AN/PDR-18 except that the AN/PDR-18 uses a 931-AY photomultiplier tube and there is a difference in positioning of the gear mechanism for operating the shutters. Power supply batteries are required but not supplied.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The unit is comprised of a sensitive phosphor, a photomultiplier tube, a switching circuit for manual selection of the intensity ranges,

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.: MIL-R-15572			
PROCUREM'T COG.: Navy, Army		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 9.1	
	- Electronics Test Equipment -		AN/PDR-18B

RADIAC SET AN/PDR-18B

ELECTROMECHANICAL DESCRIPTION: (Continued)

a balance bridge containing two pentode electron tubes, a microammeter, and a regulated vibrator-type high-voltage power supply operated from dry cell batteries. Gamma radiation causes a phosphor detector to emit light in proportion to the intensity of the radiation intensity. The emitted light is directed through a mechanically rotated shutter which presents one of four apertures to a photomultiplier tube to permit meter range selection. The signal from the photomultiplier tube is applied to the bridge and metering circuits.

Power Supply: Five 1.5 volt Batteries BA-2030/U.
Range: 0 to 0.5, 5, 50 and 500 roentgens per hour.
Type of Detection: Gamma radiation.
Type of Detector; Phosphor element.

MANUFACTURERS' OR CONTRACTORS' DATA:

Westinghouse Electric Corporation, X-Ray Division, 2519 Wilkens Avenue, Baltimore, Maryland; Contract No. NObsr 52545.

TUBE COMPLEMENT:

1 1P21, 2 5886, 1 5962, 1 6174, 8 NE-2.

REFERENCE DATA AND LITERATURE:

Instruction Book for Radiac Set AN/PDR-18B, NavShips 91662.

SHIPPING DATA:

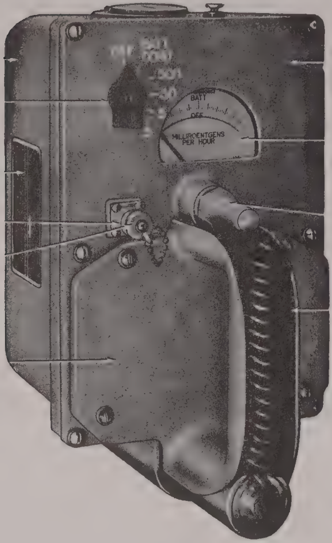
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches) H	W	D	Weight Packed (Lbs.)
1	Radiac Set AN/PDR-18B	1.38	12	18	11	35

RADIAC SET AN/PDR-18B

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radiac Set AN/PDR-18B Including:	metal					
1	Radiacmeter IM-68A/PDR-18	metal		7-7/8	5-9/32	10-21/32	8.5
1	Harness, ST-122/PDR-18						0.5
1	Radiac Set Case CY-1091/PDR-18			9-17/32	14-15/16	8-1/4	8.5
1	3/8" Socket Wrench H-114						
3	No. 6 Standard Allen Wrench						
2	Instruction Book NavShips 91662			10-7/8	8-1/2	3/16	1
1	Maintenance Parts Kit						2

RADIAC SET AN/PDR-27H



FUNCTIONAL DESCRIPTION:

A portable, general purpose instrument designed for detecting and measuring beta and gamma radiations simultaneously or gamma radiations only. Visual indication is provided by a meter reading proportional to the pulse reception rate. Aural indication is provided by headphones in which a click is heard for each pulse.

RELATIONSHIP TO OTHER EQUIPMENT:

The AN/PDR-27 series is functionally and electrically interchangeable, the major difference being in the battery complement. Power supply batteries are required but not supplied.

ELECTROMECHAINICAL DESCRIPTION:

Circuit Information: The AN/PDR-27H is comprised of two major units, the Radiacmeter IM-85A/PDR-27F and Radiac Detector DT-101/PDR-27F. Geiger Mueller (G-M) tubes are employed to detect gamma and beta radiations and provide voltage pulses proportional to radiation field intensity. The pulses are

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 9.1	

RADIAC SET AN/PDR-27H

ELECTROMECHANICAL DESCRIPTION: (Continued)

formed to have equal duration and amplitude and then fed to an amplifier and indicator circuits.

Power Supply: One Battery BA-261/U (22.5 volts); Four Batteries, RG-4(B) (1.345 volts); One Battery, 457 (67.5 volts).

Range: 0.5, 5, 50 and 500 milliroentgens per hour.

MANUFACTURERS' OR CONTRACTORS' DATA:

Admiral Corporation, 3800 Cortland Street, Chicago 47, Illinois; Contract No. NObsr 63507.

TUBE COMPLEMENT:

1 JAN-3V4, 1 JAN-5962, 1 5979/BS-1, 1 5980/BS-2, 1 JAN-2E35.

REFERENCE DATA AND LITERATURE:

Instruction Book for Radiac Set AN/PDR-27H, NavShips 92126.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Radiac Set AN/PDR-27H	3.09	15-1/8	15-1/4	28-1/8	53

RADIAC SET AN/PDR-27H

EQUIPMENT SUPPLIED:

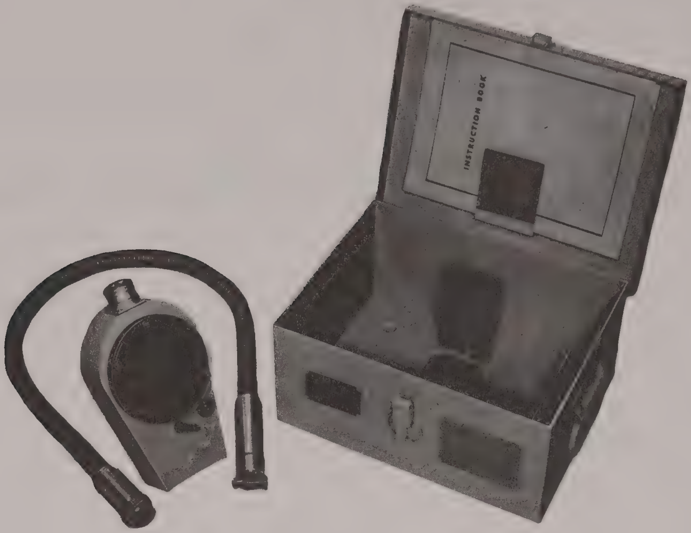
Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radiac Set AN/PDR-27H Including:						
1	Case, CY-1296/PDR-27F	aluminum		9-7/16	10-21/32	11-21/32	8. 13
1	Radiacmeter, IM-85A/PDR-27F			8	5-13/16	10-9/16	9. 31
1	Radiac Detector, DT-101/PDR-27F			1-3/8 dia.		7-1/4	1
1	Headset, H-43/U or H-43A/U			2-1/8	7	6-1/8	0. 87
1	Harness, ST-125/PDR-27E						1. 12
1	Radioactive Test Sample, MX-1083/PDR-27			3/8 dia.		5	0. 03
1	Wrench-Special			1/16 thick	1	4	0. 11
1	Wrench-Allen			5/64	45/64	61/64	0. 01
2	Instruction Book NavShips 92126			1/4 thick	5-1/2	7-1/2	1. 0
1	Tube (Spare) BS-101			1/4 dia.		2-3/4	0. 04
1	Tube (Spare) BS-1			1-1/4 dia.		7	0. 17
1	Tube (Spare) BS-2			3/8 dia.		4	0. 02

(Continued)

EQUIPMENT SUPPLIED: (Continued)

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Equipment Maintenance Repair Parts Box			14-1/4	4-1/8	14-1/4	6

RADIAC SET AN/PDR-45



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used to measure gamma radiation and detect beta radiation. Results are indicated on a microammeter calibrated in roentgens per hour.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Electronic Products 504.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The instrument is comprised of a regulated power supply, a Geiger-Mueller tube detector, a pulse generator for pulsing the Geiger-Mueller tube on for a preset period of time, and a computer indicating circuit which provides a meter reading proportional to the detected radiation field intensity. The test set also includes a beta source test sample for checking the instrument under the influence of radiation. The test sample is provided in a holder which fits one end of the detecting probe.

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			
PROCUREM'T INFO.:			
PROCUREM'T COG.: Navy		DESIGN COG.: Navy, BuShips	
F.I.I.N.:		FUNCTIONAL CLASS. NO.: 9.1	

RADIAC SET AN/PDR-45

ELECTROMECHANICAL DESCRIPTION: (Continued)

Power Supply: Two 1.5 volt Batteries BA-30.

Range: 80,000 to 2,000,000 electron volts measured up to 500 roentgens per hour in 3 ranges.

Meter Accuracy: ±20% from 10% of full scale to full scale at -20 to +50°C.

Test Sample: Provides a field equivalent to 4 roentgens per hour.

MANUFACTURERS' OR CONTRACTORS' DATA:

Electronic Products Company, Mount Vernon, New York; Contract No. NObsr 71654.

TUBE COMPLEMENT:

1 1N218, 1 EP680, 1 EP92A, 1 EP72M, 5 1N222, 1 1N461, 1 2N224, 2 2N240, 4 DR325, 1 T25H-P.

REFERENCE DATA AND LITERATURE:

NavShips 93072(A).

SHIPPING DATA:

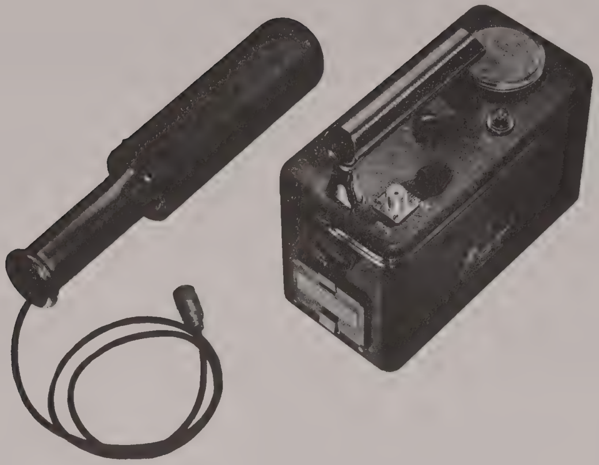
No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
1	Radiac Set AN/PDR-45 and equipment maintenance parts	1.46	10	18	14	30

RADIAC SET AN/PDR-45

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radiac Set AN/PDR-45 including:	metal					
1	Probe DT-188/PDR-45			1-3/8	1-3/8	38-1/2	4-1/4
1	Radiac Meter IM-131/PDR-45			7-1/2	5	9-1/8	1-1/4
1	Radioactive Test Sample			5/8	3/8	1-3/8	
1	Case, Radiac			6-1/4	14-1/2	11-1/8	13-3/4
1	Technical Manual Nav-Ships 93072(A)			11-1/4	8-3/4	1/4	1-1/2

RADIAC SET AN/PDR-49



FUNCTIONAL DESCRIPTION:

A portable, general purpose equipment used for the detection of neutron radiation. Average count rate is indicated by a meter located on the front panel of the test set. A phone jack permits connection of a headset for aural indications of the count rate.

RELATIONSHIP TO OTHER EQUIPMENT:

Similar to Nuclear-Chicago 2112-N.

ELECTROMECHANICAL DESCRIPTION:

Circuit Information: The test set consists of a trigger circuit, an intergrating circuit, a plug-in high voltage power supply, switching circuits, and a neutron detector. The trigger circuit is a one shot multivibrator which produces one 50 volt output pulse for each input pulse that exceeds the 0.2-volt input sensitivity. The width of the output pulse is dependent upon the time constant selected by the range switch. The intergrating circuit is used to smooth the current

(Continued)

	AIR FORCE	NAVY	ARMY
TYPE CLASS.			
STOCK NOS.			

PROCUREM'T INFO.:

PROCUREM'T COG.: Navy DESIGN COG.: Navy, BuShips

F.I.I.N.: FUNCTIONAL CLASS. NO.: 9.1

RADIAC SET AN/PDR-49

ELECTROMECHANICAL DESCRIPTION: (Continued)

pulse into a fairly constant meter current. The power supply is a sealed transistorized unit which provides high voltage for the radiation detector. An external potentiometer permits variation of the power supply output voltage. The neutron detector utilizes a gas filled chamber for proportional counting. An intergral three stage transistorized preamplifier amplifies the detected radiation before application to the count rate meter.

Power Supply: Three 1.3 volt A batteries, two 67.5 volt B batteries, two 4 volt TR-133R mercury batteries.

Input Sensitivity: 0.2 volt for 10 microsecond negative pulse.

Range: 0 to 15,000 counts per minute in 3 ranges.

Accuracy: ±2% of full scale deflection.

Meter Response Time: 4 or 15 seconds.

Detector:

Sensitivity: Approximately 1 count per second is produced in a flux of 10 neutrons per square centimeter per second from a radium beryllium neutron source.

Gamma Discrimination: Negligible response in a gamma flux of 5 roentgens per hour from radium.

Amplifier Voltage Gain: 100 ±10 within 5% between 0 and 45°C.

Pulse Rise Time: Approximately 1 microsecond.

Clipping Time: Approximately 5 microseconds.

Amplifier Input Impedance: Approximately 80,000 ohms shunted by 50 micromicrofarads.

Noise Level: 0.5 millivolt peak-to-peak.

Plateau: 1300 to 1500 volts with 6% slope.

MANUFACTURERS' OR CONTRACTORS' DATA:

Nuclear-Chicago Corporation; Contract No. NObsr 71724.

TUBE COMPLEMENT:

2 6088, 1 NE51 (lamp), 1 2N417, 1 2N169, 1 2N416 (transistor).

REFERENCE DATA AND LITERATURE:

NavShips 93058 Operating and Maintenance Procedures.

SHIPPING DATA:

No. of Boxes	Contents & Identification	Volume (Cu. Ft.)	Overall Dimensions (inches)			Weight Packed (Lbs.)
			H	W	D	
	Radiac Set AN/PDR-49					

RADIAC SET AN/PDR-49

EQUIPMENT SUPPLIED:

Quant. Per Eq'pt	Name and Nomenclature	Case Mat'l	Stock Numbers (USAF) (Navy) (Army)	Overall Dimensions (inches)			Weight (Lbs.)
				H	W	D	
1	Radiac Set AN/PDR-49 Including:	metal					
1	Computer-Indicator, Radiac CP-371/PDR-49						7-3/4
1	Detector, Radiac DT-191/PDR-49						3/4
1	Headset						
1	Instruction Manual						